



COOP'S
SATELLITE
DIGEST



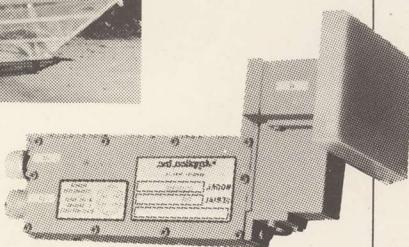
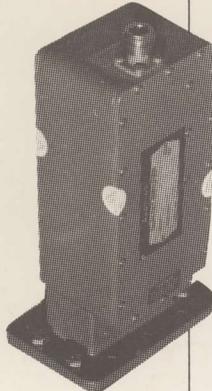
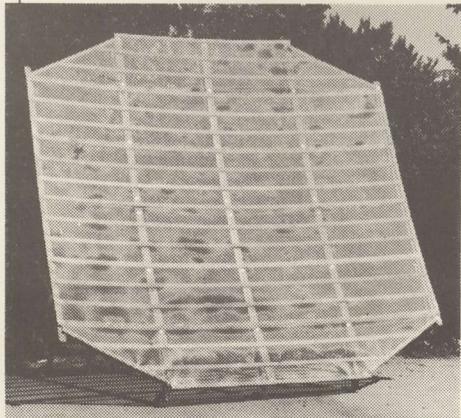
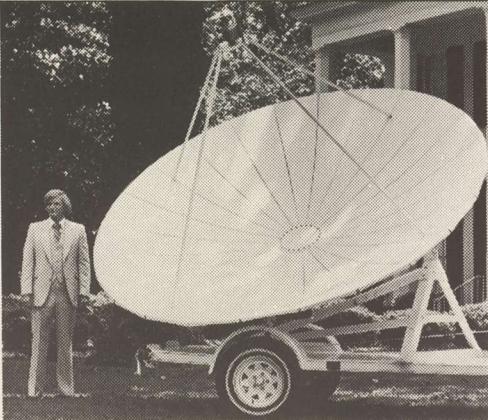
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COOP'S
COMMENT ON
TECHNOLOGY

FERTILE IMAGINATIONS...

Years ago (way back in '76 or so) when the satellite industry was 'young' and I was still involved in the cable end of this business there was always a gathering of the satellite gear peddlers during the various cable TV trade shows where satellite gear was set up and demonstrated. It usually took place at the local watering hole and there were a dozen or so regulars sitting around the table trading funny satellite stories.

These were sharp engineers, mostly young, who loved to talk about the "what if's..." of the business. One of the subjects we often discussed (usually after the fifth beer or so) was commandering (as in taking over) a satellite. A couple of the engineers had worked for RCA; they knew a little bit about the SATCOM 'security system' and how one would set out to override it and actually take SATCOM off and 'hold it' for ransom. By the 7th beer we usually had SATCOM parked someplace over the Indian Ocean under 'our' control and we were haggling with RCA where to deposit the ten million bucks in a secret Swiss account. It was a lot of harmless fun.

Then one day in the winter of 1978 somebody actually jammed transponder 1 on F1 and immediately several of us called one another on the telephone. We each denied we were involved of course but jointly wondered if perhaps somebody was actually warning RCA that a take over of a bird was imminent. Eventually the jamming ceased and RCA and the FCC and NASA and everyone else that tried to find out where it was coming from failed in their task.

After the Miami SPTS Steve Gibson and I were lounging in a hotel in the Florida Keys talking about strange things in this business. We got to talking about the Russian Molniya bird (which neither of us had seen at that point; something we eventually corrected). Steve observed that after the Russians turn the Molniyas off the birds slide southward over the eastern seaboard and head out towards the South Atlantic, losing altitude all of the way. "After they turn it off and they have switched their command controls to the next bird in the chain couldn't you (meaning anyone; not necessarily me in

particular) turn it back on again?" he mused. I agreed that seemed plausible. It might even be good sport to 'borrow' a Molniya for an hour or so and uplink (and downlink) our own 'amateur' signals through it. Across the 'pond' Steve Birkill in England once commented to me that if he was to uplink to Molniya he and I could talk directly from England to Oklahoma. He had figured out what it would take in the way of uplink antennas (10 foot would do) and transmitter power (50 watts would be enough) to get a voice grade signal through. Yes, satellites offer all sorts of opportunities.

Not too long ago I sat into a meeting with several monied, **serious** business people. They had a plan (actually 'have' is correct since it is still alive). Ghorizont, the Russian satellite at 14 degrees west, covers virtually all of the South American continent plus most of Africa, lots of the mid-east, the Caribbean and even parts of the U.S.A. These chaps are planning sort of an international HBO type of operation. They will rent a transponder on Ghorizont from around 6 PM Moscow time until around 6 AM Moscow time. Uplinking from some location in the western hemisphere they will send scrambled movies, sporting events and so on through Ghorizont. With the footprint of Ghorizont a 16 foot dish and ho-hum electronics would provide sparkle free signals. Using four sub-carriers (one in English, one in French, one in Spanish and one in Arabic) they would provide simultaneous audio for each program in four languages. Using sub-carrier subs they would provide native-tongue screen graphics. Using the vertical interval they would send out coded commands to receivers.

They plan to sell the service to individuals, to large international hotels and casinos and even to terrestrial re-broadcasting services. Oh yes, these are all American citizens involved in renting 12 hours a day on a Russian satellite.

Would the Russians rent a transponder? The answer is yes. Would the U.S. government stop it? Not likely; Ghorizont covers only a small part of the U.S. and few seem inclined to watch it anyhow. Where would the programming come from? I asked that question and got a cat who ate the mouse smile. I interpreted that to mean 'no problem' and you can read into that anything you wish.

Would it be a viable project? I wasn't so sure initially. Now I have made up my mind and I think it would fly well. Is it likely to happen? We'll have to wait and see.

Satellites bring out the best (and probably worst) in people. They bring out the greedy and the dreamers. They cut all of the bounds and constrictions that keep us earth locked and they make possible projects undreamed of only years previous. Someday somebody probably will attempt to steal a satellite and hold it for ransom. Someday somebody probably will turn on a descending node Molniya, talk through it, and then discover they don't know how to turn it off as the bird heads over their horizon. Boy will that confuse the Russians when it swings northward again over the Indian Ocean! And someday Ghorizont may be carrying 'Smokey and The Bandit'.

C
S
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TECHNOLOGY



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USING MID-BAND TV CHANNELS FOR SATELLITE DISTRIBUTION

GETTING IT THERE

If you are entering the satellite TV world with an eye towards providing one or more satellite delivered signals to various multiple dwelling units (such as apartments, condos, trailer courts and other 'permanent residence' facilities) you probably have come to grips with the problem of keeping your in-facility re-transmissions 'secure'. Most satellite system operators in this area of business look upon existing multiple residence locations as an opportunity to either sell a system or sell a service; the two are not necessarily the same as we shall see.

Virtually any multiple residence facility with 100 or more 'potential users' of satellite signals is a candidate for your service. Your service could consist of providing either a single channel of premium television (such as HBO, SHOWTIME, The Movie Channel) or it could be some 'viewing package' made up of multiple bird delivered signals. However like all areas of economic endeavor the key to a successful operation is getting paid for the service.

There are two approaches. Number one says that you bid the job on the basis of selling the full service to the apartment owner, condo group or whatever legal body as may exist to negotiate with you. In this instance you look upon the sale of the system as a 'one-shot' business opportunity; you create a system to fill their needs, install it, get paid for it and walk away. You would come back only if they need maintenance of some sort.

Number two says that you don't sell them anything. You negotiate a 'service agreement' with the legal entity, plan your system, install it, and then you operate the system (and collect the money for same) on an on-going basis. The second approach is the one that holds the best long term profit potential for you since you will be creating what the cable industry calls 'a cash flow machine'; a system that cranks out dollars to you each and every month for as long as you are able to operate it. In truth, a wired distribution system operated for cash returns in an apartment building, condominium, trailer court or whatever is simply another type of cable television system (see companion article on Copyright in Programming section of this issue of **CSD**).

The economics of such a system will be dealt with in some detail in a future issue of **CSD**. Basically it looks like this:

- 1) You have an initial expenditure to install an earth terminal with a number of receivers (if you are carrying multiple satellite signals).
- 2) You have an initial expenditure for channel modulator equipment (to place the satellite TV channels onto some TV channel).
- 3) You have an initial expenditure to cover the cost of taking those signals from the central ('headend') point in the facility and delivering them to the individual residences spread throughout the building(s).

To offset these expenditures you have two sources of income.

- 1) An 'installation fee' which is charged each residence in the facility, charged at the time the installation is con-

nected to their television receiver(s);

- 2) A monthly 'service fee' charged typically at the beginning of each month for the month ahead.

Given these knowns (the expenditures) and the expected revenues (projections) you can create your own 'paper model' of how efficient your business will be. This is called a 'cash flow projection' and it will show you how successful the business might be spread over some period of time. If you are able to secure financing for your system (through a bank), the period of time you negotiate to pay back the loan for the initial expenditures will determine how much 'overhead' you have per month to pay off the initial expenditure.

Your monthly operation overhead will consist of (1) repaying a loan you received to initially install the system - plus interest, (2) your personnel costs to maintain the system and make the necessary connections and dis-connections as people move in and out of the facility, and, (3) your cost of programming (i.e. the amount you pay each month to the satellite program suppliers for use or re-sale of their product).

Those are the basics. Now what about the matter of getting the program signals out of the TVRO reception facility and into the individual residences? There are really only two ways to accomplish this; through the air (as in broadcasting) and through coaxial cable (as in re-transmission). Through the air is 'out' for most readers since this immediately presents two new problems. First there is the matter of being licensed for use of the public airwaves and second is the matter of 'scrambling' or 'encoding' the transmission so that only those people who are authorized to receive the signals can do so. You naturally wish to limit reception to those people who are willing to pay for your service.

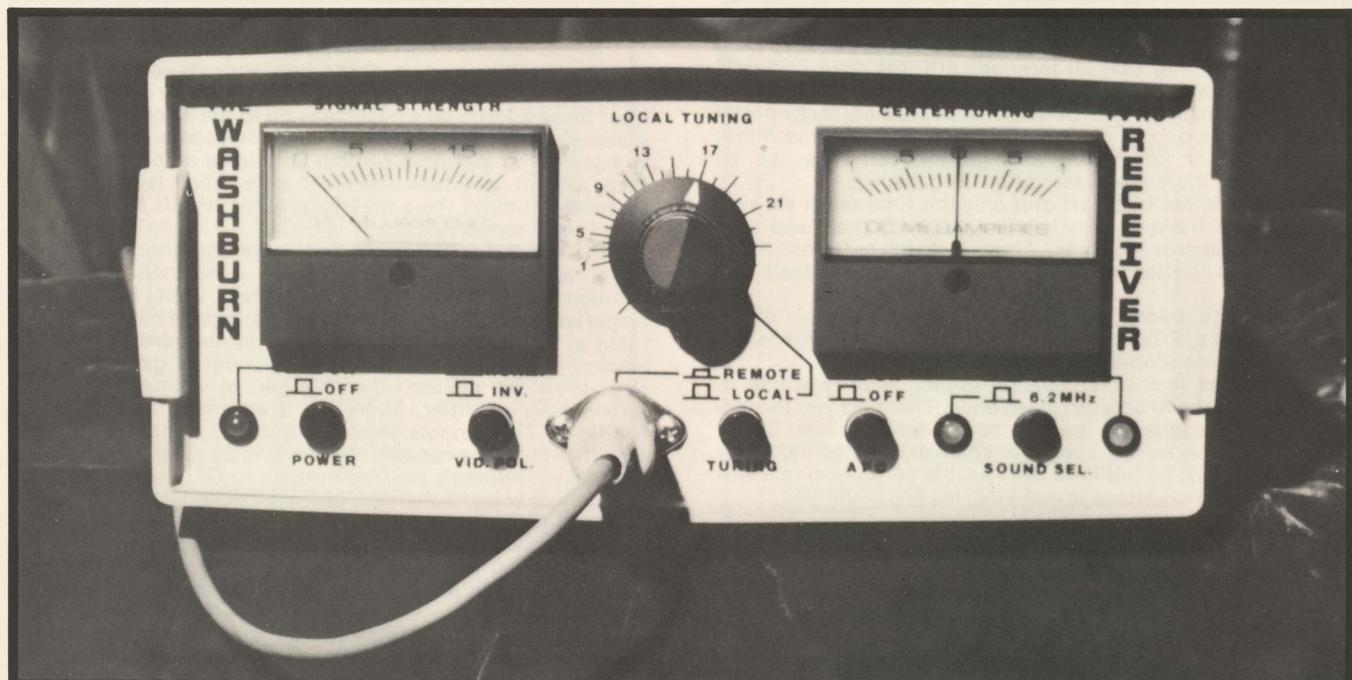
Coaxial cable 're-transmission' then becomes the viable alternative since no broadcasting license is required (although in some instances an FCC 'Cable Television License' may be required; see companion report in Programming Section). However when you use coaxial cable several new 'minor' problems or obstacles present themselves.

There are two types of permanent residence facilities here. Those that already have a built-in coaxial cable distribution system, and, those that do not. To place a **new** coaxial cable distribution system into an **existing** building will cost you between \$50 and \$150 per residence. A 100 unit facility then could cost you \$5,000 or it could cost you \$15,000. The wide range in cost is due to the wide range in building practices found; getting cables inside of and routed through many buildings is a very expensive proposition. Naturally then you would prefer to deal with a facility where these cables and associated electronics already exist.

In the latter category we have two new groups; those systems that were installed following good cable TV engineering practices, and those that were not. Unfortunately the latter (those that were done poorly) outnumber the former. The mere presence in a facility of a cable distribution network for television is no guarantee that the system is operating well enough to carry your high-quality satellite delivered signals. How can that be?

Well, people who build large permanent residence facilities largely have no feeling for a 'good' TV cable system and a 'bad' TV cable system. The cable TV industry learned this many years ago when it began growing and attempting to 'plug in' its own multiple channel services to these existing 'sub-cable-systems'. There are many-many areas where designs errors can be made or where installation errors occur which result in the quality of the TV signals delivered to the individual residences being of poor quality. To top these two problem areas off most such systems are poorly maintained (if maintained at all) and what may be inferior to begin with gets worse in time.

You can tell on your own just how poor a system 'appears' to operate by simply inspecting it. Obtain a master layout of the building(s) cable distribution system and note where the signal amplifiers are located. Trace where the signals begin (at the 'headend') and where the 'line ends' are located. Then arrange to inspect the television reception at as many **line ends** as possible. To be sure you are seeing the true picture, take along your own portable TV receiver. This eliminates variations in 'subjective eyeball checks' created by different TV receivers at



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each location.

Write down your observations. Is there a 'pattern' to what you see (assuming that all locations are less than perfect)? Perhaps you can identify certain 'legs' of the system where the pictures look bad while on other 'legs' the system looks pretty good. That's a good sign; it indicates that with some minor maintenance or equipment changes the bad legs can be brought up to the levels of service on the good legs.

If they all look bad start over only this time select viewing locations which are roughly half way between the 'head end' and the respective leg ends. Again look for patterns. If the pictures look 'better' but still not perfect that in itself is a pattern.

Finally go to locations which are close to the start of the individual legs. From all of this you can ascertain the nature and extent of the problems with the existing system.

1) All legs look good near headend, slightly worse in mid-legs and poor(er) at leg ends. That tells you the signal voltage levels leaving the headend are low. Somebody saved a few bucks per channel by selecting headend output amplifiers not capable of producing sufficient signal voltage to make it to the end of the line.

2) One (or less than all) leg looks poor at end, good in middle. Look for a bad cable connection (in a fitting, amplifier, tap) between the point where the signal is OK and where it falls off.

And so on. Logic prevails; map it out, think it out, and then route-out the problem.

Let us assume that the existing system is useable, even if with difficulty. If we assume the opposite (the system cannot be used) we already know the solution; rebuild it, or, leave it intact and build a new **second system** into the facility. If the system can be fixed up to properly distribute the existing signals it is carrying, our next problem is to determine whether or not we can add additional signal channels to the system.

There are basically two types of in-building(s) systems to be considered here. Those that place all of their signal amplification at the start (headend) point and those that boost or re-amplify the signals at one or more points along the way with 'line amplifiers'. If all amplification is at the headend, then the balance of the system is passive; that is, everything **after the headend** is cable, line splitters, customer taps and terminators. This simply means the system is 'simple' in design and frankly this is the best type of system to add new channels to. More elaborate systems are so (cable) 'long' that unless repeater amplifiers are placed in the cable (legs) along the way the cable plus customer service devices eat up so much signal that there is not enough to make it to the end of the line.

The cable industry standard calls for between 1,000 and 2,000 microvolts (0 dBmV to +6 dBmV) to be delivered to the customer's receiver. You determine the actual signal level present by connecting the wall outlet (F fitting) jack through a short jumper to a field strength meter; a measurement unit that reads out to you the actual signal level(s) present on each of the TV channels operating through the system. Field strength meters (or signal level meters; abbreviated FSM and SLM) are priced in the \$250 to \$1500 range. You'll need one capable of accurately reading out the signal levels present on the channels you expect to encounter.

Each customer outlet is 'adjusted' for signal level (ideally between 0 and +6 dBmV) by careful selection of the 'signal tap off device' that inserts into the coaxial line at that location. A tap off device 'isolates' the customer location from all other customer locations to insure that anything crazy that happens at that location is not fed back into the system to adversely effect other receiver outlets. In the process of 'isolating' each outlet, a certain amount of 'signal loss' is built into the tap-off device. On purpose. Tap-off devices can be designed to have any amount of 'loss' desired. The system designer weighs how close the customer service location is to the amplifier (or headend) and then estimates what signal level (in dBmV units) will be present in the cable as the cable passes by the outlet in question. He then selects a tap-off device with the proper amount of 'loss' to give the customer the proper signal range (0 to +6 dBmV). An example? Let's say the signal level in the coaxial line is +25 dBmV at the residence. The designer wants to deliver +6 dBmV to that TV outlet so he selects a customer

tap-off device that has 25-6 or 19 dB of "loss".

If your system has no amplifiers in the legs (only one master amplifier system at the headend) you can add new, additional channels to the system without any concerns for what those additional signals may do to the electronics in the system. Why? Because the only electronics after the headend is 'passive' or operating without additional amplification and such system electronics do not care what levels (within reasonable limits) there may be present. We'll see how you select new channels shortly.

However if your system does have amplifiers on one or more 'legs', then you have to be concerned about the addition of new channels. Why is that? Well, every (line) amplifier unit has a set of 'operating ratings'. The amplifier is rated at so many dB of signal 'gain' (a measurement of the amount of amplification). But this amount of gain is always cross-specified against the number of channels passing through the amplifier. Therefore if an amplifier is rated to handle 12 TV channels and provide 30 dB of gain, the same amplifier might be capable of providing 32 dB of gain if there were only 8 channels passing through it. Or perhaps 28 dB of gain if there were 15 channels passing through it.

This suggests, rightfully, that where you encounter a coaxial cable distribution system that does employ 'line amplifiers' that you need to inspect each amplifier. Check to see if the (inside of amplifier) 'Gain Control' adjustment is **turned up fully**. If it is, and the pictures are not good at the line ends, the amplifier is already operating at maximum gain with the existing number of channels and any additional channels may result in your having to turn the gain backwards; making the reception at the ends even worse. This tells you that you will have to change out such amplifier stations with units capable of greater gain (output) for more channels. You will need to increase the gain 'capability' when you add channels although perhaps not the actual signal gain. One of the undesirable things that happens when you add more channels to an amplifier that is already running at maximum output capability (with the channel 'loading' created before you add channels) is that the amplifier may develop a case of 'cross-modulation'. This is where the video sync information from one or more channels 'transfers' to other channels in the system. The effect is a 'windshield wiper' sliding across the screen; annoying to say the least.

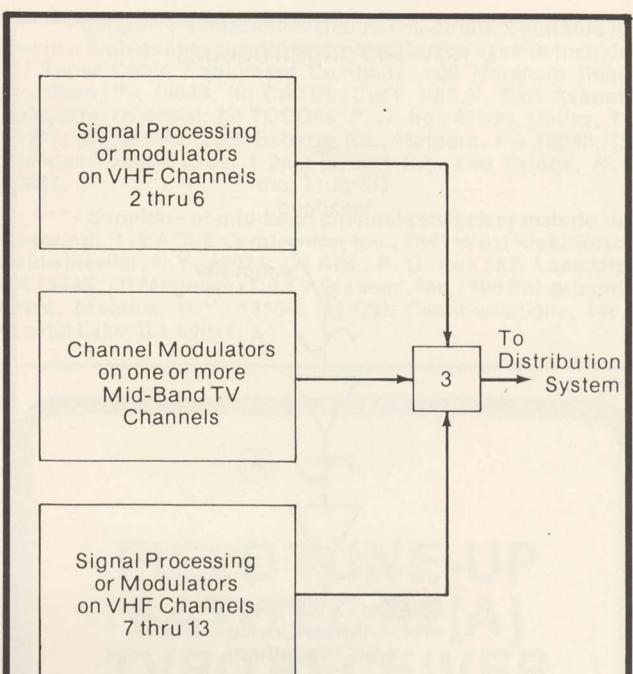
Upgrading the system amplifiers, if there are any after the headend, is not a big deal. It may cost you \$200 per amplifier to change them out and there are seldom more than a few involved.

Security For You

Assuming you can get into an existing coaxial distribution system with your satellite delivered channels, how do you make any money at it?

Again we have a couple of choices. If the whole facility (**each residence**) was to take the full satellite service, you could probably work out an arrangement with the facility operator. If everyone's monthly facility fee went up by say \$15 per month you could deliver \$3 to the facility (or condo owners association), and then spend the \$12 remaining between paying for your programming services and servicing your own system debt and operating expenses. Unfortunately most facilities will not agree to 'universal' service so you have to engage in some sort of door to door sales campaign to initially determine the interest in the service and then later actually sign-up the customers.

Many would be system operators are aware that while the standard VHF (UHF) tuning television receiver covers channels 2-6 and 7-13 (in the VHF range) there are something called 'mid-band' channels in use in many of the nation's newer cable TV systems. Mid-band channels were created by cable systems caught in a squeeze for spectrum space for their growing channels. It works this way (see illustration here). Low band channels 2 through 6 occupy the spectrum 54 to 88 MHz. The FM broadcast band occupies the region from 88 to 108 MHz. Between 108 MHz and 174 MHz are various aircraft, public service, amateur and other frequency assignments. A cable system expects itself to be secure; that is signals from outside the cable don't 'leak in' just as signals inside don't leak out. If it is properly designed and maintained, this is quite true.



MID-BAND CHANNELS CAN BE ADDED TO MOST EXISTING VHF DISTRIBUTION SYSTEMS WITH MODULATORS OPERATING ON MID-BAND CHANNEL FREQUENCIES.

Therefore the region between 108 MHz and 174 MHz, on a typical cable system, is 'blank' or devoid of any signals. For various technical reasons the 120 to 174 MHz segment is desirable for adding new TV channels to the system.

Alas, the standard TV receivers connected to the system (the new Zenith sets being an exception to what follows) are **not equipped** with 'tuners' or 'dial positions' for these new 'mid-band' channels so in effect these channels cannot be seen by the cable viewers. To solve this problem the cable firms provide a converter device that sits atop the receiver and allows the subscriber viewer to 'switch' between regular (2-13) reception and mid-band reception (A through H or I).

Other cable firms look upon the fact that (most) home viewers are not able to tune in these mid-band channels as a blessing. This becomes a spot where special services, such as SHOWTIME or HBO, can be placed. Then for those subscribers who agree to pay an extra fee for the special services, the cable firm provides a converter. It may have several other names on it (decoder, descrambler, etc.) but it is basically a mid-band tuner that receives the mid-band channels and then frequency converts them to some standard channel (such as 3 or 4).

Now if you are going into an apartment / Condo complex with an existing coaxial cable distribution system and you want to be able to keep the satellite programs secure (i.e. off the dial of those residences that don't agree to pay for it), would not the mid-band channels be a good place to head? Maybe yes...maybe no.

If the cable system in place uses only headend amplifiers, you can add the new mid-band channels quite easily. Come from your satellite receiver with video and audio, go into a good quality mid-band channel modulator and then loop into the headend equipment with a three way signal combiner (low band VHF to one input, mid band to another, high band VHF to the third with the trunk or 'output' leaving the combiner). The primary consideration here is to be sure that your mid-band

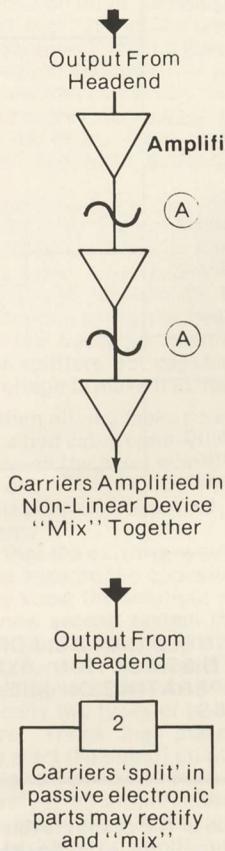
modulators are capable of the output **levels** required to match the levels coming out of the existing VHF channel units. Measure or determine the output level for channel 6 (or the highest 'low band' channel) and then do the same thing for channel 7 (or the lowest 'high band' channel). Look at the numbers. They will typically be something like +42 dBmV (for channel 6) and +52 dBmV (for channel 7). Note that the 'high band' channels run out of the headend at a higher level than the low band channels. This is done to compensate for higher cable 'losses' at the high band channels than at the low band channels. Since mid-band is approximately half way between 6 and 7, you would start off by splitting the difference. Your modulator on the mid-band channel(s) should run out in the +47 dBmV region in our example.

Now suppose the existing coaxial distribution system has one or more line amplifiers. Either they will handle the new mid-band signals, **or they won't**. There are a few very old 'line' amplifiers about (typically very early transistor units or older tube units) which do not **pass** mid-band. They have separate amplifier circuits for low band and high band, and the mid-band region is ignored. Obviously these, if you run into them, will have to be changed out.

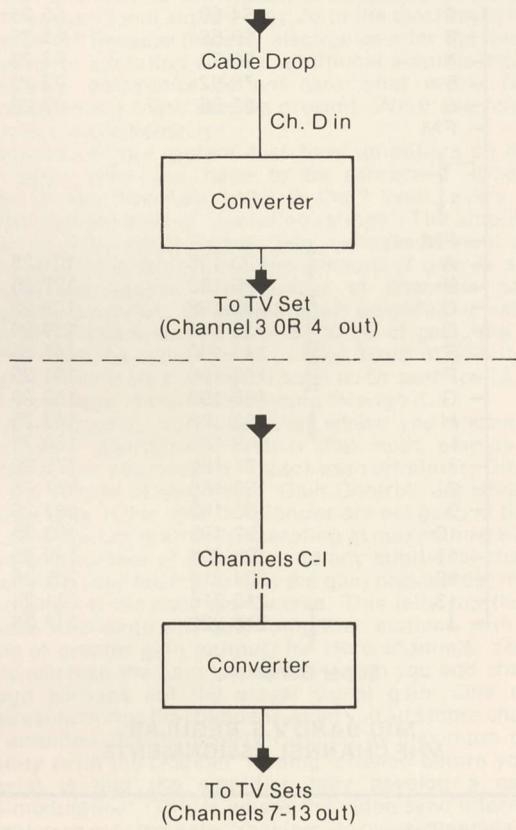
Every line amplifier has a certain amount of distortion built into it. Distortion in this business occurs when an amplifier is not 'linear'. Since a purely linear amplifier is virtually a laboratory curiosity, in the field you will run into mostly amplifiers that are supposed to be linear but are not.

mostly amplifiers that are supposed to be linear but are not. **Non-linear amplifiers** develop something called '2nd Order Distortion Products'. That's a fancy phrase for undesirable mixing. For example, if **when** a channel 10 TV signal and a channel 4 TV signal go through our real-world "linear" amplifier both are amplified. But - the frequency of channel 10 (193.25 MHz) and the channel 4 frequency (67.25) "mix" together in the amplifier. This mixing action produces a **new** signal; actually two of them. One of these is the **sum** (193.25 + 67.25 MHz or 260.50 MHz) and one of these is the

HOW 2ND ORDER OCCURS



RECEIVING MID-BAND SIGNALS



difference (193.25 - 67.25 or 126 MHz). Well, the 260.50 MHz signal generated or created in our amplifier does not bother us here; it is far higher than any of the channels we expect to use. But, the 126 MHz signal created does concern us since it falls in 'mid-band'; squarely on the boundary between channels 'A' and 'B'.

And that is just one example of what can happen. When you take all 12 VHF channels (plus the FM band signals) and start figuring out all of the possible combinations of adding any two together or subtracting one from another...well, you end up with a computer listing several feet long. Again, the combinations that concern us here are those that 'fall' or 'land' in our mid-band channels since we are now looking at these channels with an eye towards using one or more of them for cable distribution within an apartment or condo or whatever complex.

Let's see what the concerning-combinations might be.

In an illustration here we see how a standard NTSC television channel 'lays out'. The visual carrier frequency (VCf) resides 1.25 MHz up or inside from the **bottom** edge of the 6 MHz wide channel assignment. This is where the maximum energy for the video is. Then 3.58 MHz above this visual carrier frequency we find a special extra carrier; something called the color 'sub-carrier'. It is not very strong and it is easily fooled, in the TV set, by the appearance of other unwanted carriers near it. Finally .25 MHz down or inside from the **high** end of the 6 MHz assignment we have the audio carrier.

Note that we show channel 'A' in our illustration. When an amplifier on the cable line amplifies the 12 standard VHF channels, we end up with three sets of unwanted carriers or signals around 120 MHz; right on the edge of the channel 'A'. These come from regular channels 9, 8 and 7 mixing

respectively with regular channels 4, 3 and 2 (9-4, 8-3 and 7-2). Now also look between the VCf and the color sub-carrier. Here we have the mixing result of channels 2 + 4 and 3 + 3 (or the second harmonic of channel 3).

And note that we show channel 'D'. Just below the VCf we have the 'mixing' products from 12-4, 11-3, 10-2 plus 5 + 3 and 6 + 2. And above the sound carrier we have the 'mixing' product of 6 + 3 (etc.). But none of these fall **inside of** the channel 'D' **video** spectrum space. That's good.

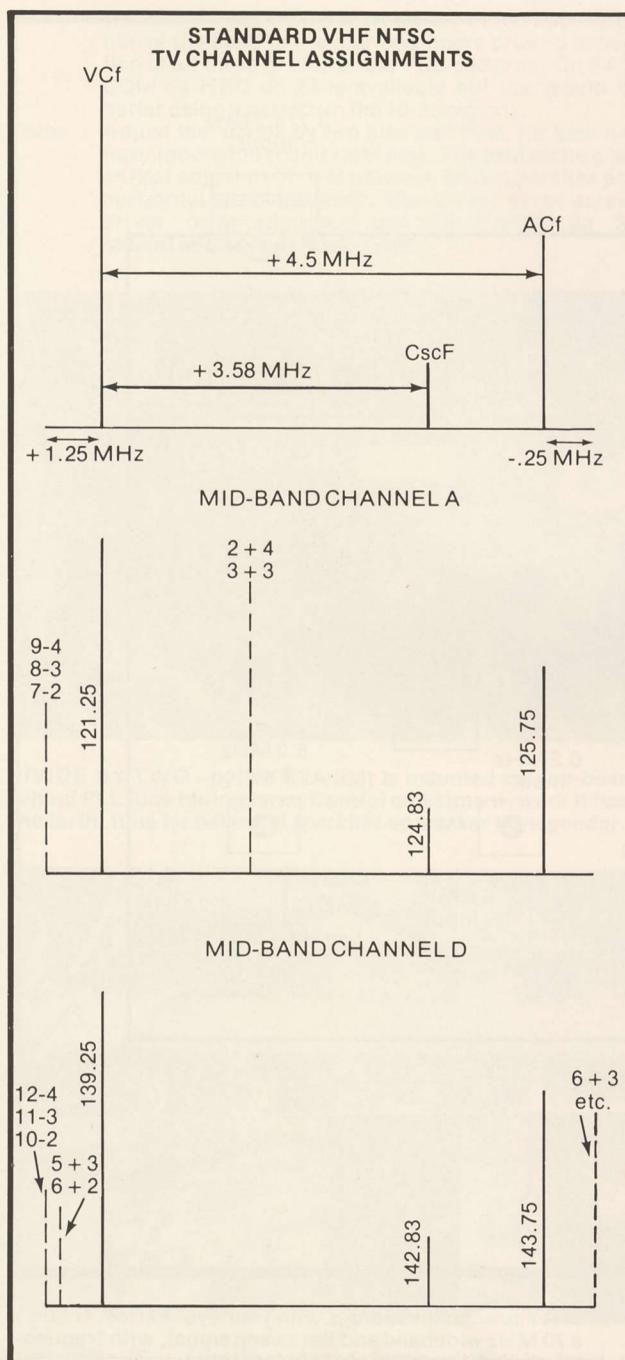
Just how severe mid-band 'mixing' might be, or how much of a problem it might cause you, is almost impossible to predict. The answer depends upon the vintage and design of the line amplifiers and a host of other factors beyond your budget to correct.

The bottom line is simply this. You **can use** mid-band channels even with existing line-amplifier systems. The **best channels** you can use are mid-band channels 'D', 'E', 'H' and 'I'. However, I is immediately adjacent to channel 7 and many sets can 'pull' their fine tuning controls to tune-in Channel I (when tuned to 7) so that is not exactly secure. The one minor problem with channel H, by the way, is caused by channel 6. If your system is not using 6, then H is one of the best mid-band choices of all.

Equipment Choices...

Mid-band channel modulators are available from several sources (see * here). They are designed for cable TV use, are typically well designed for adjacent channel operation but usually require an external device known as a 'bandpass filter' at the output to insure that their radiated signal is kept confined to their channel bandwidth.

Mid-band converters are very popular items with the cable operators; they vary from units that convert a single channel to a standard VHF dial position (with a 'regular cable'



and 'premium cable' dual position switch to select between the normal service and the 'mid-band' service) to units that convert groups of channels (such as G, H and I) to three adjacent standard dial positions (i.e. 2, 3 and 4) and then to units that convert all of the mid-band channels (C to I or A-G) to the seven high band channels (7-13). Price? They vary from the \$15 region single channel units to \$35 range for more elaborate units. Most have a 'fine tuning control' so the viewer can tune in the best looking picture.

Recovering from your cost for the converters is usually handled by accepting a 'refundable deposit' from the subscribers. The deposit should equal your cost for the converter; in effect the customers finance your converter purchases for you.

* - Suppliers of mid-band channel modulators suitable for use in a high quality coaxial cable distribution system include: [1] Toner Cable Equipment Company, 969 Horsham Road, Horsham, PA 19044; [2] CATEL/CWY, 405 N. Earl Avenue, Lafayette, IN 47904; [3] TOCOM, P. O. Box 47066, Dallas, TX 75247; [4] Jerrold, 2200 Byberry Rd., Hatboro, PA 19040; [5] Blonder Tongue Labs, 1 Jake Brown Rd., Old Bridge, N.J. 08857.

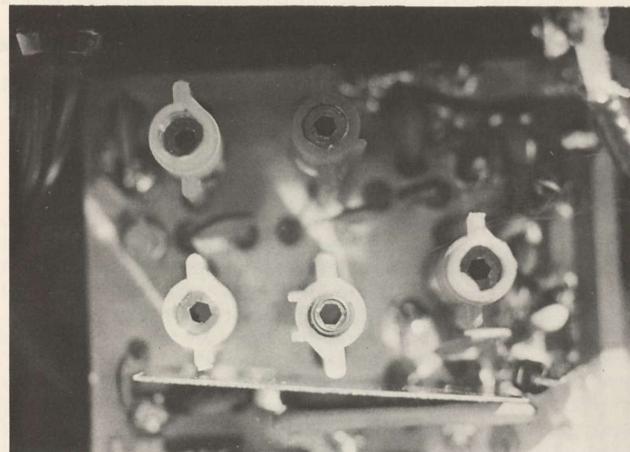
** - Suppliers of mid-band channel converters include the following: [1] EAGLE Comtronics, Inc., 7841 West River Road, Baldwinsville, N.Y. 13027; [2] AEL, P. O. Box 552, Lansdale, PA 19446; [3] Magnavox CATV Systems, Inc., 100 Fairgrounds Drive, Manlius, N.Y. 13104; [4] Oak Communications, Inc., Crystal Lake, ILL 60014.

FIELD TUNE-UP SAT-TEC R2[A] TVRO RECEIVER

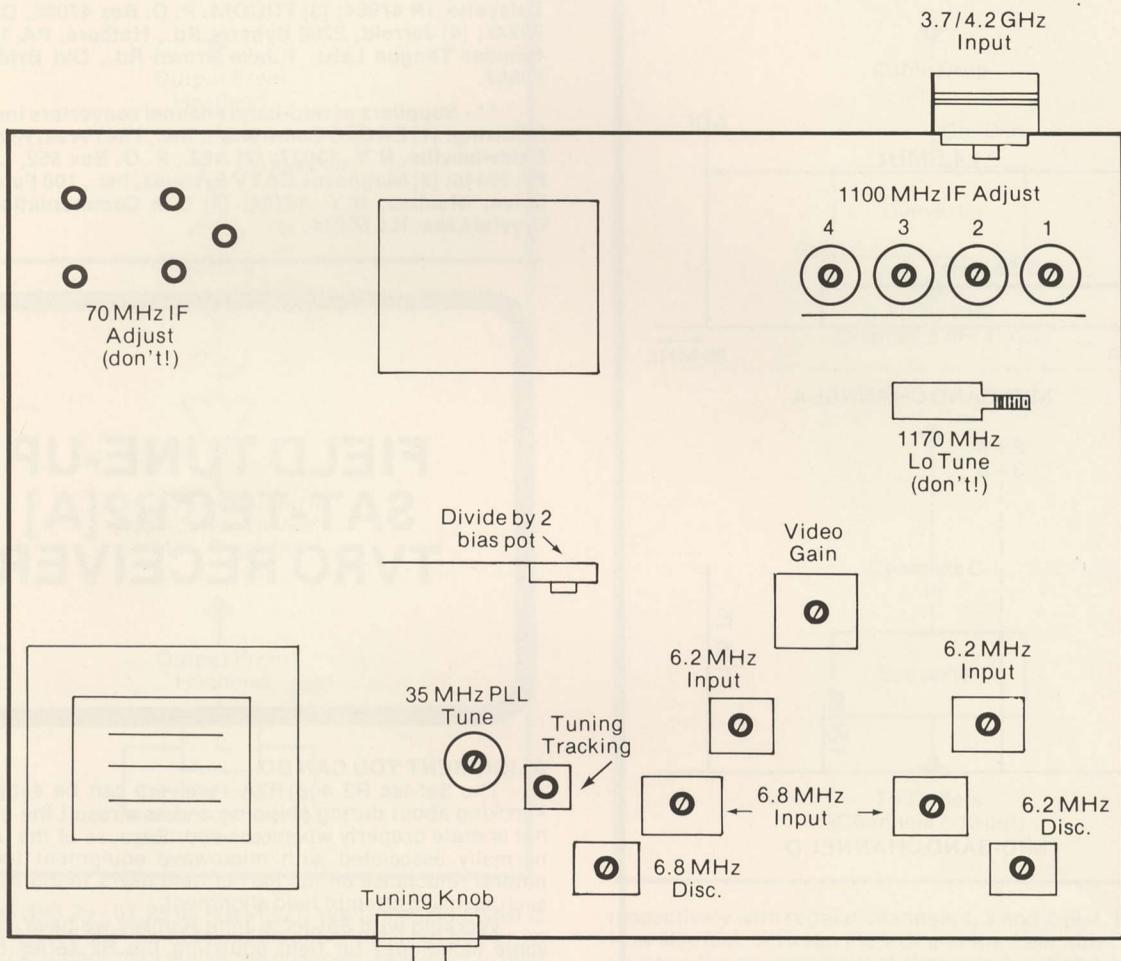
ALIGNMENT YOU CAN DO

The Sat-tec R2 and R2A receivers can be subjected to knocking about during shipping and as a result the units may not operate properly when received. Because of the 'mystery' normally associated with microwave equipment there is a natural reluctance on the part of field users to dig into a unit such as this to attempt field alignment.

Working with Sat-tec's John Ramsey we have developed some techniques for field adjusting the R2 series receivers which can be performed with nothing more exotic than a good quality video monitor (or RF receiver fed by a modulator in turn fed by the video and audio outputs of the receiver). Using John's recommendations we took an R2 and R2A (the A is the latest version with the divide-by-two PLL circuit) and worked with them. With this report you should be able to check



DON'T TOUCH - 70 MHz 'range' IF adjustments require sweep equipment with markers to properly align.



SAT-TEC R2A FIELD TUNING

alignment of your own unit(s) if you follow these techniques.

There are only a handful of alignment or adjustment points that you can reach in the R2 series receivers. We'll deal with two areas which you should **not attempt** to touch up or align first since we don't want the instructions to follow to lead anyone to do alignment 'damage' which can only be corrected by the factory.

1) As the drawing and photos here shows we have a 1170 MHz local oscillator tuning slug in the upper right hand corner. This LO adjustment is **NOT** to be touched. It determines the high IF operating parameters and must be set with a frequency counter. We have found that there are only small odds that this adjustment can get out of whack so don't worry about getting 'peak' performance by turning it just slightly one way or the other. **It either works or it does not** and tweeking on it may get you from working to not working in a big hurry. Leave it alone.

2) And as the drawing/photo layout shows in the upper left hand corner we have five slug tuned forms. These are your bandpass alignment on the 70 MHz IF. There is **NO**

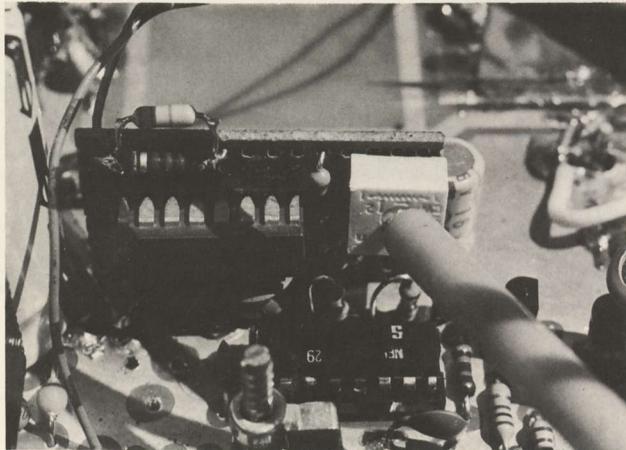
WAY to align these slugs with your eye. Period. It takes a 70 MHz wideband and flat sweep signal, with frequency markers, properly coupled into the input and then detected at the output with a sweep demodulator and displayed on a scope. The alignment of this section depends upon considerable inter-action from adjustment to adjustment. A slight mis-tuning of one or even all five will **NOT** show up in the picture. Can these adjustments get knocked about in transit? Not likely; the forms used here are quite solid and once this section is properly aligned it can be left alone for the life of the receiver.

Having dealt with the "no-no's" in the receiver, let's look at those adjustments which you can work with.

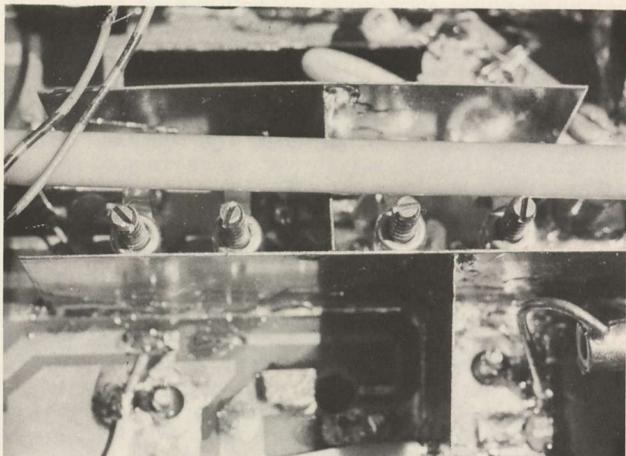
- One** - Connect up the receiver in the proper fashion and see if there is any indication of a picture. Unfortunately for you to move ahead in the sequence you must start with at least some picture, even if frightfully weak.
- Two** - Tune in a test pattern (if you can find one). Try to select a test pattern in the upper half of the 'band'

(WESTAR 1 has PBS patterns daily in the upper portion of the band in the morning hours prior to activation of all three or four of the PBS patterns. On SAT-COM FI HBO on 24 is available but you would be better using a pattern in the 10-20 region).

- Three** - Adjust the 'divide by two bias pot' first, for best picture. Ignore the sound right now. The best picture is a critical adjustment; it is between white sparklies and horizontal running bands. Use a very small screwdriver or an alignment tool with a metal tip. **Be patient and have a steady hand.**



DIVIDE BY TWO - pot on R2A unit is mounted on sub-board behind PLL tune tuning form. Careful adjustment, work it back and forth, tune for balanced sparklies on weaker transponder.



1100 MHz IF - four slug tuned forms visible in front of alignment tool. See test and work carefully. Numbers 4-3-2-1 as seen here.

- Four** - Now find the four '1100 MHz IF adjustment' forms. Use only a fully insulated tool (**no metal at all**). Adjustments 1 and 2 are the input on the 1100 MHz IF and adjustments 3 and 4 are the output. Start with 1 and very-very carefully tune for best picture. This adjustment is the **most critical** of all and just a slight nudge will take you from picture to no picture. Take a deep breath and nudge it both ways. Now go to number two and repeat. Return to number one again and number two again. Note that no big adjustments in this section are likely. If you have gone 1 complete turn **YOU HAVE GONE TOO FAR**. And adjustment 1 must be correct or the rest don't matter (if you



PLL TUNE - very careful adjustment required - work it back and forth per text.

find no picture at all, you **could** start with adjustment number one here hoping that it will bring in a picture). Now go to adjustment 3 and then 4, go back to 3 and then back to 4. John Ramsey suggests you do this alignment on a high transponder (i.e. 12 up on 24 channel satellite) and then go back and repeat it for 'fine tuning' on a lower transponder (under 12). We found we could optimize performance with both our R2 and R2A in either portion of the band **alone**, but not over all of the band. The difference between optimized performance and not optimized is very slight however and is noticeable only on a weak bird. Note: **Do not** adjust 1, 2, 3, 4 in that sequence; work 1 and 2 and then 3 and 4.

Five - Now locate the 35 MHz PLL tune slug and using an insulated tool carefully adjust for best picture; typically when you have equal amounts of 'salt' (white sparklies) and 'pepper' (black sparklies).

Six - Go back and check the 35 MHz PLL tune one more time following the instructions given in step three.

Seven - Now we are to the audio or sound section. Both the 6.2 and 6.8 MHz audio circuits have two input adjustments (see diagram/photo) and a discriminator (detector) adjustment. Start with the most-left input adjustment and look for least 'hiss'. Now adjust the discriminator for least distorted audio. You may have to repeat this sequence several times and you may find that the input tuning on the first adjustment is broad. When properly tuned the three adjustments should be quite sharply peaked. If you can tune either of the input adjustments through a complete turn or more and notice no change in the audio, you are not properly aligned. Repeat the sequences.

Eight - Finally, adjust the video gain pot for (ideally) one volt peak to peak output. Lacking a meter or scope to do this accurately, turn the pot until you see your picture distort (black and white fold together in bars) and then back off about 1/4 turn.

There is one more adjustment marked in the drawing; a very small trimmer pot mounted on the circuit board between the 35 MHz PLL tune and the 6.8 MHz discriminator. This is a master tuning or voltage set control for the front panel knob that tunes in the transponders.

These warnings. No adjustments move very far. Most adjustments require a very steady hand and 'rocking' or 'nudging' of the adjustments rather than real 'turning'. Use only insulated tools where called for; metalized adjustments tools will detune the circuits and you cannot tune with them. With this information you may be able to perform your own field touch up alignment thereby saving you a couple of weeks in delay while the receiver goes back to Sat-tec. And since transit seems to cause some alignment problems, you are obviously better off doing final alignment in the field anyhow!



VIDEO GAIN - adjust for 1 volt peak to peak or for best looking video through an outboard modulator.

MORE ABOUT LNA GARBAGE GETTING INTO RECEIVERS

MORE ON LNA NOISE

The November (1980) issue of **CSD** carried a report from Taylor Howard regarding the 'image noise' problem which has recently been a concern to small system operators. For those who missed that report, here is the problem:

- 1) Double conversion TVRO receivers (those that convert first down to a 'high IF' in the 1100 to 1300 MHz region and then later to 70 MHz or the 'low IF') **in the private terminal field** have relatively 'wide open' front ends. The front end is that portion which accepts the 3.7 to 4.2 GHz bandwidth energy from the satellites.
- 2) Whereas many **commercial** receivers depend upon a 'pre-selector' system built into the receiver to reject signals 'out of band' (i.e. away from the 3.7 to 4.2 GHz range) private terminal receivers largely depend upon the LNA (with its built-in form of 'pre-selection') to reject out of band signals.
- 3) Interference to a home TVRO system **can come** from 'real' out of band signals (i.e. radar and other microwave band signals away from 3.7 to 4.2 GHz), but if the LNA itself has signal 'gain' or 'noise' out of band it can also cause problems.

This is especially true if there is a 'noise floor' coming out of the LNA that is above a certain level (we'll see how much level) in the region that is the satellite receiving frequency minus the high IF removed. For example if you are tuned into transponder one on F1 (3720 MHz) and the IF is 1100 MHz, then the satellite frequency (3720) **minus** the high IF (1100) is 2620 MHz. Now if the LNA has too much noise coming out of it in the 2620 MHz region, that noise will ride into the system and cause noise-floor interference as 'image noise'.

Taylor Howard has recently completed a series of checks

on LNAs from each of the four 'name' LNA suppliers. Here is what he found:

- 1) **In order** for the satellite television picture to not be degraded noticeably (i.e. the human eye can spot the degradation) the noise floor coming out of the LNA at and below approximately 3 GHz must be at least - (that's **minus**) 70 dBm.
- 2) **DEXCEL units** clearly were superior (reports Tay) with noise floors of -75 dBm (more is better here; we are dealing with negative numbers!). **Next best** was SCI with a -72 dBm noise floor. Tay does report that he did find an 'older' (vintage unknown; but not 'current') SCI unit which was clearly not acceptable. Two SCI units checked from recent production average in the -72 region which is good.
- 3) **Avantek units** checked ran in the -55 dBm region; far too much noise. They clearly cause picture distortion (noise that cannot be cleaned up). We'll come back to putting a 'fix' on these units shortly.
- 4) **Amplica units** were even worse; in the -50 dBm region.

Now the fix (you suspected there was one; right?). The obvious thing to do is to buy only SCI or DEXCEL LNAs. No, they did not sponsor these tests so this is not some clever ruse on their part to get their units 'elected' as best.

Avantek says they will tune their amplifiers to specifically meet customer requests for a (maximum) noise floor of -70 dBm. They add the large letter 'F' to all units that have been so tuned. Simply insist on getting an Avantek unit with the letter 'F' added (one does wonder how, out of 26 letters, they selected 'F'!). So much for Avantek. If you already have an Avantek unit without the letter 'F' in the nomenclature and you have been fighting dirty pictures we suggest you contact the folks you got your LNA from. Or stay tuned - we have another suggestion coming up.

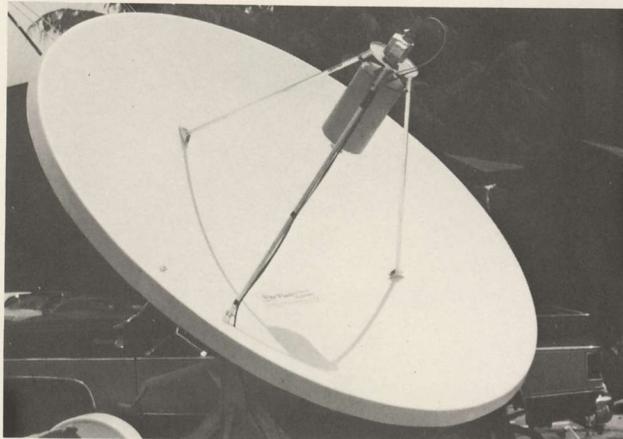
Amplica is now installing high pass filters (to eliminate any out of band - image - energy from their amplifier) in their LNAs. Amplica will **also** retrofit any LNAs now out there with the high pass filter. Nice people but you'll lose use of your LNA for a couple of weeks.

Now the best solution (we feel) of all. Tay Howard and Royden Freeland (ICM) have gotten together and using a device Taylor designed and proto-typed ICM (International Crystal Manufacturing Company) is now selling an 'ICM Purifier' (one letter F in that one). The 'Purifier' installs **between** your LNA and your receiver. Inside is a good spot for it. It has a five pole printed circuit bandpass filter (that gets rid of the garbage) **along with** a low noise amplifier. It operates from 10 to 20 volts (DC) and draws about 15 mils of current. There is a screwdriver pot on it to adjust the gain from plus 5 (dB) to about minus 10 dB. That +5 dB may help make up for a long feedline; that minus 10 dB may make your ICM (or other 'balanced gain' design) receiver work better (!). There is a male N type fitting on one end (input) and a female type N fitting on the other end (output end to run a jumper to the receiver(s)).

Taylor didn't say so but we see another application here. When you run the output of an LNA into a two-way (or four way if you are big time) hybrid signal splitter, and then drive the split LNA signal into two (or more) receivers there is another problem that relates to the same wide open front end. These private receivers (several we tested anyhow) send some amounts of garbage back **out** of their 3.7 to 4.2 GHz input terminals. That garbage can get (even through a hybrid splitter) from one receiver to the other. Now if you installed two of the Purifiers (one after the splitter, but ahead of the receiver) in the two legs of the splitter output we suspect (but can't say from tests because we haven't tried it yet) you can clean up the receiver inter-action.

Suppose you don't think you have an LNA 'noise problem'? Taylor says the addition of the ICM Purifier will improve performance of any LNA - inexpensive (meaning one without a pre-selector) receiver combo. Tay says "the improvement is barely noticeable (but there) with a DEXCEL LNA or SCI LNA but it is easily noticeable on an Avantek or Amplica". One supposes that if you have \$125 laying around even if you think the signal is perfect you could do worse than ordering a Purifier.

Starview Systems Has ALL OF THE STARS COVERED!



NEW!!! Everything At Dish!

Starview Systems has teamed up with Robert Coleman to introduce the ultimate low-cost complete system. Shown first at SPTS San Jose, the full TVRO receiver (including LNA portion) mounts at the dish! Our 10R system has a complete 10 foot dish antenna, plus a remotely tuned receiver that is housed at the dish feedpoint. Just bring down the low-cost RG-59/U to your TV receivers. Here is a **complete** system that delivers NTSC re-modulated satellite signals on VHF channels 3 or 4. The price? A real breakthrough at \$4650! Find out more today.



NEW!!! Coleman 3742 Receiver!

Scan-tuned, multiple audio sub-carriers, local or remote control, superior threshold performance, full metering, double conversion of course. And available exclusively from Starview Systems. Ask about early delivery today!

LNA SUPER SALE - Continues!

YOUR CHOICE - 100 degree (!) K, 50 dB gain top of the line LNAs for just \$1095. OR - Avantek 120 degree K, 50 dB gain low noise amplifier with the new 'power block' DC coupling system that allows you to use your TVRO downline for powering! Instant delivery on this top grade LNA at the unbelievable price of \$795!

STARVIEW DEALER SPECIAL

Get in on the ground floor as a TVRO dealer in your area! Starview Systems provides you with everything you need; professional instruction plus the finest mobile sales terminal on the road today. Included is a 10 foot Starview parabolic equipped with rotating feedhorn, Avantek 120 degree K LNA, top of the line Microdyne 24 channel tuneable receiver, 75' of coaxial and connection cables plus a trailer to get you to the demo site and operational in 30 minutes time. And the price? An unbelievably low \$7200!!!



STARVIEW SYSTEMS

H & R Communications
Route 3, Box 103G
Pocahontas, Ark. 72466 [501/647-2001]

BEAUTY IS MORE THAN SKIN DEEP



YOU HEAR a lot of talk around these days about the so-called 'upper market' in home satellite terminals; those folks who live in \$200,000 plus homes who want home satellite TV but who have an aversion to an over-sized 'bird bath' sticking out of their superbly manicured rose garden. **STS of Missouri** recognized early in this game that not everyone was going to fall in love with the shiny white graceful lines of a typical satellite parabolic antenna. We knew that 54% of the people in this country are women and we also knew that 68% of this nation's wealth is held by women. That's why we created the most beautiful home satellite antenna on the market today.

IF YOU are a dealer in TVRO systems perhaps you should re-evaluate your own sales approach. YES - **you think** satellite dish antennas are beautiful. But perhaps your customer does not. Our dealers tell us that they can average 60 to 70% sales to demonstration ratios. That means for every ten times you set up a demonstration, between 6 and 7 terminals will sell. On the spot. We think a good part of this amazing success story is due to the fact that our antennas look as good to the woman of the family as the pictures look to the man of the family. REMEMBER - most people now buying terminals don't care about super-PLL recovery or LNA noise temperatures. They are concerned only with two things...what the installation looks like sitting in their \$200,000 yard...and...what the pictures look like on their TV set.

NOT EVERYBODY WATCHING home satellite TV is an engineer in love with our technology. A good sales presentor and presentation captures the flavor and imagination of the potential buyer's mind. **STS of Missouri** makes it possible for our dealers to sell high quality systems backed up by the industry's most professional staff of packaged hardware suppliers. If your present line of hardware is turning big-ticket customers off, come over to the 'Good Looking Professionals' in home satellite terminal systems. We are as near as our toll free telephone number.

STS OF MISSOURI

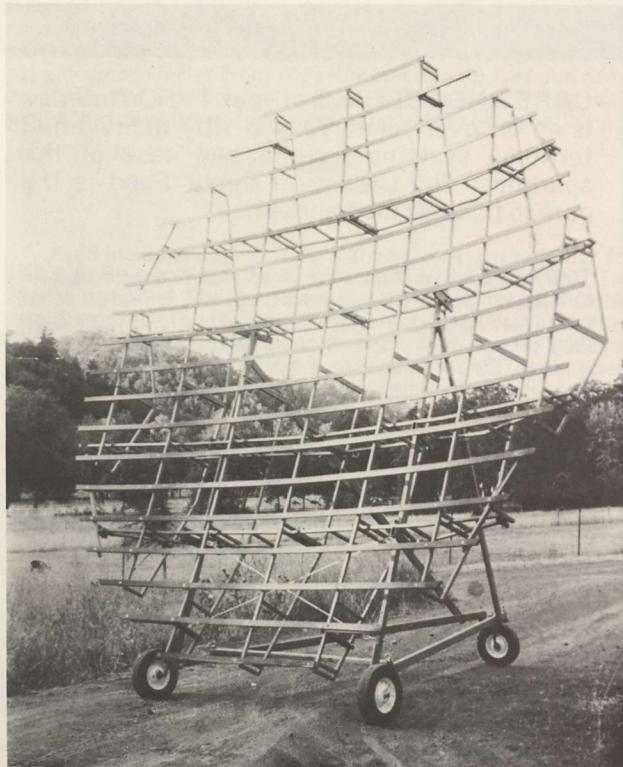
P. O. Box 1181, Poplar Bluff, MO 63901
Call toll free 1-800-325-0761

TECHNICAL CORRESPONDENCE AND NOTES

WEST COAST MOBILE ANTENNA

Enclosed please find photographs (less the screening) of an antenna kit which we are building and intend to market. This antenna has been designed since we attended the SPTS '80 meeting in San Jose. The antenna is designed so that it may be assembled using simple hand tools. It may be positioned from one satellite to another by rolling the wheels of the mount. It may be vertically adjusted by adjustable arms on the rear. The antenna may be constructed in two sections, each six foot by 12 feet and assembled on the site. The surfacing is screen wire stapled in place. The total weight with a steel mount and frame is around 300 pounds while aluminum comes closer to 200 pounds. We expect the antenna will be sold in kit form for around \$950 complete but parts of the system will also be available as separate items. Looking forward to seeing you in Houston.

R. Kronner, President
Spherosat Antenna Mfg.
453 W. Freeway
Roseburg, OR 97470



Always happy to welcome new ideas, products and companies to the exploding TVRO field. The first 'report' is considered news and we print them as such. After that it becomes advertising!

LIKES IT

I am new to the world of home satellite TV and I'm very excited about it. I have subscribed to **CSD** and am very impressed with it. How can I protect my LNA from lightning voltage surges and transients? I am using an ICM 4300 receiver with an Avantek LNA and power block. Do you know of any insurance company that will insure against TVRO system damage for lightning and surges? I am thinking of becoming a dealer in TVROs and would like to know how I can get additional 'Permission Certificates' for CBN.

Dan Pince
Pavillion, WY 82523

The safest protection system for an LNA is a 12-18 volt battery system. The typical LNA draws around 150 to 225 mils of current and this means that if you have a battery supply with a small trickle charge across the terminals you can in turn connect the LNA DC supply line to the same battery. The trickle charge should be rated to just about match the current drain of the LNA. The battery provides an excellent source of regulated voltage and its 'sump' serves as a capacitor to catch transients. For lightning, make sure the dish is well grounded, the bolts holding the LNA and feed securely tightened to the dish mount (clean off paint to get bare metal to metal contact) and for extra precaution run the DC power line to the LNA plus the coaxial transmission cable underground (i.e. bury it) between the antenna and the receiver.

ROHNER ON RE'JEAN

I have some comments on the M. ReJean letter appearing in **CSD** for August. **On soldering chip capacitors** - plastic tweezers are really not a good way to hold chips while soldering. Go to a medical supply or a college book supply and get some dissecting tweezers. These have fine, precision tips and make holding small chip capacitors easy. Also they are metal which gives some heat (sink) protection. I use a standard Weller soldering station (700 degrees). Start by placing a small pool of solder on the board where one side of the chip will go. Pick up the chip with the tweezers, reheat to flow the solder and place the chip. Then solder the opposite side of the chip. This is the production technique NASA recommends. **On NEC** - while not formally represented at SPTS San Jose I think NEC was kind of represented there by me. As you are aware I was selling at SPTS GaAsFET and bipolar and hybrid NEC devices at our Rohner booth. I will help anyone who wishes to use the NEC parts and will continue to sell them. **Nicad batteries** - while use of the Nicad batteries is highly regarded I believe for line protection a plated type battery is really superior. Jell cells or motorcycle batteries, for example, are particularly well adapted to powering an LNA with a trickle charger. The reason they are better is found in their response curves; the slower curves of the plated types make them react more like a huge capacitor when there are surges or transients. **Regulator noise** - to anyone who has designed radio equipment this is a well known problem and a valid concern. The fix is also fairly well known and should be a second nature circuit addition to a designer. After the regulator all active sections of the receiver should be fed voltage through a large choke decoupled at the output end with a .1 MFD capacitor of the axial lead or ceramic chip family. This procedure will generally cure the problem and will minimize 'crosstalk' via the power lines and between stages or devices. The additional cost is generally only a few cents per power line. As an aside, I always recommend that you not run any regulator off of another regulator output as this causes undue loading of the initial regulator and could cause instabilities to occur in the regulation producing white noise. For higher frequencies, use a 4.7 uH choke for decoupling. **Finally**, on another matter, there has been interest in rebroadcasting on UHF with a simple device capable of delivering signal over a couple of miles. The NEC MC5121 wide band hybrid (which we sell) is capable of

delivering 1.5 watts of RF into 75 ohms in the UHF TV band. If one comes out of a TVRO receiver on channel 3, 'mixes' back to a UHF channel and then drives the NEC MC5121 you would have an inexpensive way to link to a site several miles away. We are working on it for package form.

John P. Rohner
West Liberty, Iowa 52776

TV IN ALASKA

My son and I have been reading 'Receive TV From Satellites' in Popular Mechanix. Our nearest TV station is 250 miles away and we have poor reception at times. Reading your data gives us hope that there may be a better answer. We have a large subdivision between us and we live 16 miles northeast of Homer. We are now building our Glacierville Sales and Service Center and plan to make this into an up and coming community to itself. We have talked with other land owners here and there and are five of us who would like to share in this project. We are looking for the proper kind of equipment to do the job right and have the cash money available to get started on it right now. I hope we can get the support of the suppliers on this project.

Harry J. Schade
S. R. A. Box 48A
Homer, AK 99603

Anyone that lives 250 miles from the nearest TV station and who classifies their reception as 'poor at times(!)' is certainly a prime candidate for a private terminal.

TV IN THE HIMALAYAS

I am English, living semi-permanently in the Indian Himalayas from 7,000 to 15,000 feet up depending upon the season. In an effort to remain 'informed' of what is going on in the world and London, I have bought a Trio R1000 receiver, radio teletype unit that displays on TV, a National Panasonic UHF/VHF TV and a few VHF converters for my radios. Now that I have a taste for long distance audio I would like to try to install something for satellite TV if it is within my means and limited technical knowledge.

As you might imagine, the Himalayas and even India proper is about the worst place in the world to try to get the necessary components or even information. I will have to bring in everything I need via 'mail order'. My total knowledge of receiving TV from space is that I will need some type of parabolic dish plus a converter or something to get from the Gigahertz region down to the VHF or UHF region. Now I know that the system must be more complex than this so I would appreciate some help!

J. W. Petrie-Baker
c/o Manali Consumer Store
P. O. Manali
District Kulu, H.P.
India

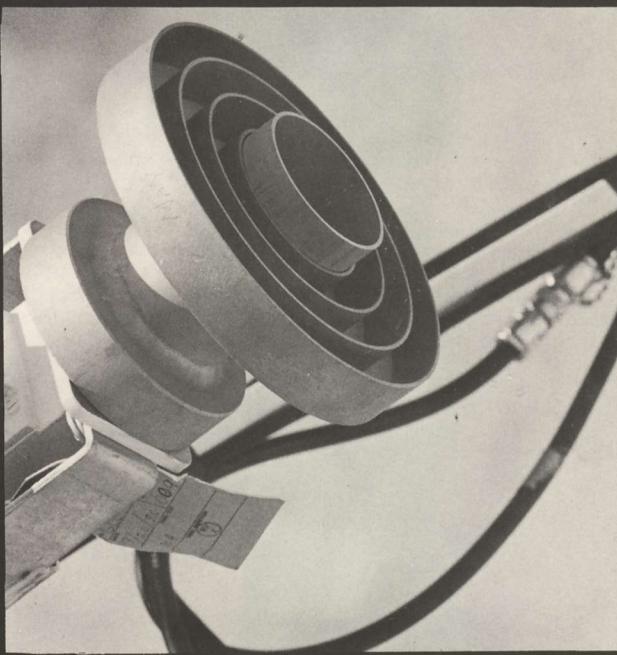
Talk about a location custom made for the 15 foot Umbrella antenna! We can just picture the whole system being back-packed into the high country when the 'season' changes.

NO TV IN PENNSYLVANIA?

I live in the Central part of Pennsylvania and our cable system is very unsatisfactory. They showed us one day of ESPN via satellite and then unhooked it. Their official word was that 'perhaps in five years they would install satellite TV service here'. Frankly I am tired of being pushed around and would like more TV variety. I have no idea what a home satellite receiver system would cost but if it is \$20-30,000 the price is out of the question. If it is closer to \$3,000 then I want one; now. Can you help me find out where I can get this system?

Ed Boal
318 Kimport Avenue
Boalsburg, PA 16827

CARE About How You FEED Your TVRO Antenna!



CARE AND FEEDING of your TVRO Antenna is an oft overlooked reason why many small terminal systems have a bad case of the sparklies. The Chaparral Super Feed is the cure to this common ailment.

THE SUPER FEED gets the last fraction of a dB of gain out of your parabolic surface. It replaces horn and other non-precision feeds which because of 'illumination limitations' fail to achieve maximum 'dish gain' for your system. The increase in antenna gain with the Super Feed is well documented (for reference, see **CSD** review, July 1980) and may be as much as 1.5 dB! Super Feed bolts to your LNA (mates standard CP-229 flange) and is designed for optimized performance with dish f/D's in the .3 to .5 region.

DELIVERY is immediate from stock. Price is \$135 in single lots. Call or write for more information on the Tay Howard designed Super Feed!

CHAPARRAL COMMUNICATIONS
P. O. Box 832 / Los Altos, CA 94022
(415) 941-1555

MIS-READ ROHNER

Unfortunately your computer program for antenna point (see page T14 for August **CSD**) contains a few uncertainties which makes it difficult to use.

In line 70 one closure of brackets is missing. In line 230 it should read ATN rather than ANT and CSO should read COS. There is also a number 1 over a number 2 between (1/K) and SQR and it is not identified and no indication whether it should be multiplied, divided or whatever. This makes another interesting program difficult to use. I would appreciate having the corrected details.

H. Drillich
Managing Director
Austenna Pty., Ltd.
9-11 Stewart Street
Richmond, Victoria
3121, Australia

Can anyone straighten out this chap who is down under?
We suspect the program needs to be 'reversed' also for those who live south of the equator.

CASCADE MICROWAVE / AGAIN

Like many experimenters I have been having difficulty locating sources for microwave items. I scan all of the Ham and other electronic magazines hoping to find some sources. In the June (1979) issue of **HAM RADIO** I noticed an ad by Cascade Microwave; a copy of which is enclosed. After some correspondence with the owner, Cliff Blackstone, I ordered and paid for a downconverter he offered at \$1349. I received my LNA in jig time but without the rest of the units was unable to check it out. It took him from October of 1979 to March of 1980 to finally complete my order. When I did receive all of the units the LNA proved to be defective. I return it to him under the warranty, by certified mail. Since then I have heard nothing. I have filed complaints with the Post Office Inspector and the Oregon Department of Consumer Protection. I would like to know have others have had problems with Cascade Microwave Labs? There are some backyard technicians getting into the TVRO boom and apparently some of them cannot cut the mustard. So it behoves us all to be aware. When you started carrying advertisements for microwave components in **CSD** I ordered some parts and have had good results. SimComm Labs sent me an LNA kit which I assembled and it works great. I also got a downconverter from GHz Engineering and various SMA couplings and small parts from Satellite Innovations. So far it seems that all of the people advertising in **CSD** are reliable.

Fred N. Shilzony
Mauna Loa Video Systems
Naalehu, Hawaii 96772

Fred includes a letter from Norma Rowe, Investigator for the Department of Justice Consumer Protection Division, 500 Pacific Building, 520 SW Yamhill, Portland, Oregon 97204 (1-800-452-7813 in Oregon; 503-229-5548 elsewhere) in which Ms. Rowe suggests their department is looking into Cascade Microwave Labs. If you have been 'bitten' by CML, we suggest you send details to Ms. Rowe.

80°K LNA?

Lately I have been hearing much about an 80 degree Kelvin parametric LNA that is quite inexpensive. I have yet been unable to find any information about its sources. Any information would be appreciated.

Rogersville TV Cable Co.
Rogersville, TN 37857

At SPTS '80 San Jose Canadian experimenter Nelson Ethier (the same chap who has done the parabolic antenna manual) described a homebrew parametric amplifier using Microwave Associates off-the-shelf hardware parts. Nelson uses a 24 GHz 'Gunnplexer' as a signal source for the parametric system. It is not fully developed and may not get Nelson's fulltime attention for many months since he is now up

to his neck in antenna and receiver systems at Comm-Plus. Getting the system to 'broadband' (i.e. cover 3.7 to 4.2 without retuning) seems to be the major problem although Nelson has found that tuning the parametric over the band [it is about 80 MHz wide] may be a simpler solution using varactor diodes. He says that with about \$700 in MA parts you can build one yourself and we have asked him to supply us with the information for publication. In the interim we see 85 degree K GaAs-FET LNAs coming down under \$2,000 so commercial manufacture of parametric amps in the 80 degree range may not prove necessary after all. For home builders however it offers another interesting choice.

UPLINK PRICES

I can understand your regulatory tolerance toward home receive terminals but I expect some resistance to the idea of up-links which do not meet rigorous technical standards, particularly emitted bandwidth and antenna pattern. Good luck with your '\$25,000 uplink' none the less. For anyone who might be gathering parts for an uplink, we have an older type HPA (high power amplifier) and some of the associated uplink electronics that you used in Oklahoma in 1978. We found it easier and cheaper to buy a new HPA and some other components than to overhaul the older units.

I. Switzer
Switzer Engineering Services Limited
5840 Indian Line
Mississauga, Ontario
L4V 1G2 Canada

Sruki has parts available which may be serviceable if you are thinking about building the world's first \$25,000 uplink system'.

GILLASPIE PROBLEMS

As a subscriber to **CSD** I want to congratulate you for providing a much needed service to individuals constructing their own TVRO systems. I do, however, have a serious problem with the author of an article in **CSD**. In the June 1980 issue you ran an article titled "Single Conversion / Approach # One" by Norman Gillaspie. The article states that the two Alpha Industries diodes required cost \$25. Unfortunately Alpha has a minimum order amount of \$100 so in fact you have to buy 8, not two and find someone to take the extras off of your hands. Following the article I sent a check and order to Norman Gillaspie. After many phone calls (to his recorder), letters and weeks of writing I finally gave up and demanded a refund of my money. After several more letters demanding a refund Mr. Gillaspie called me on September 20th and agreed that the amount to be returned was correct and he stated that a refund would be forthcoming. It has not arrived. Mr. Gillaspie has not responded in a normal ethical business manner and therefore I am forced to take unpleasant actions to recover my money. I realize **CSD** is not responsible for actions (or lack thereof) of vendors in the magazine but I felt you would wish to be aware of their lack of performance.

Robert H. Eaton
Rancho Palos Verdes, CA 90274

We too have had an unpleasant experience with Gillaspie. He had agreed to appear at SPTS '80 San Jose in advance, along with GHz's David Barker, to discuss single ended conversion systems. At the very last minute Gillaspie called us and told us he could not make it (a 15 minute trip for him) unless we agreed to let two of his friends into the Seminar without paying. We finally reached an agreement whereby he was supposed to supply our Lab with some wired and tested boards which we then in turn were going to report on extensively here in **CSD. We felt Gillaspie's last minute demands were unethical but after having promised to have him on the program felt it was better to 'give in' to his demands than disappoint people who expected to see him. Oh yes...four months later we still have not received the wired and tested boards. Caveat emptor.**

TECHNICAL NEWS NOTES

FCC ACTION to allow 'low power' television stations to operate throughout United States on 'non-interference' basis may be most significant TV related action of Commission since 1952 decision to expand to UHF. Hundreds of 'early bird' applicants have already submitted applications to Commission and financial backing of Sears (through Allstate Insurance venture capital fund) for one group of 100+ indicates serious nature of service. Virtually all applicants are citing use of **satellite delivery services** as part of applications and indications are several 'specialty networks' will be formed. Among new networks being created for service is Neighborhood TV service headquartered in Arizona, planning a 'country and western' TV service. Many groups are citing use of specialty programs in daytime, use of Gene Autry's VEU service (WESTAR I) in evenings for scrambled movie delivery. In spite of favorable FCC approvals court and possible Congressional review may be ahead so don't hold your breath expecting instant service. Station applications run from well over \$1,000,000 initial construction costs to \$100,000 region. Using TVRO and UHF broadcasting techniques developed by **CSD** readers there is no reason why 1,000 watt transmitter plus TVRO receive facility can't be put together to satisfy FCC requirements for **under** \$50,000 however.

CABLE battle over use of 3 meter (10 foot) terminals for reception from WESTARIII still rages. SPN is giving away or almost giving away total of 300 terminals in the 3 meter class; as incentive to cable firms to carry its service from WIII. SPN provides antenna and LNA and miscellaneous hardware; cable firm provides receiver. National Cable Television Association office of technology has come out **against** cable users installing 3 meter size antennas; cautioning that such small antennas leave no 'margin' for system degradation and also warning cable systems that should FCC shorten satellite to satellite spacing to as little as 3 degrees smaller antennas may not be able to adequately separate signals. SPN has countered with its own engineering thesis which shows 3 meter antennas adequate for most areas of USA. SPN was buying antennas from Prodelin (M/A) but after some apparent timely delivery problems has switched to AFC/Microdyne for 3.6 meter antennas.

NOT VISIBLE in western hemisphere, latest Soviet launch in Statsionar series is now operating at 85 degrees east longitude. Bird is believed to have same 32 dBw Global contour as Ghorizont II (at 14 degrees west), carries six 4 GHz downlink transponders (see CSD for September 1980).

EARLY pioneers utilizing new spot beam signal on loan to Australia by INTELSAT for creation of first satellite relayed Australian TV national service are finding same problems early North American pioneers encountered. A 16 foot terminal in Perth is receiving service along with many smaller antennas along eastern and northern coast. Service availability north and east of Australia in neighboring island-countries is attracting much interest from people heretofore cut off live television service and access to the day's news events.

LOW NOISE AMPLIFIERS

3.7 – 4.2 GHz DOWNCONVERTER

- 3.7 - 4.2 GHz in, 70 MHz out
 - Remote, one control tuning
 - Dual conversion - stable
 - Assembled & tested \$895

Polar Mount and Remote Feed Rotation Plans For Your Dish SUPER! \$10.00 postpaid

- Teflon PC Board dielectric constant 2.55 1/32" x 9" x 4" \$14.00
 - Chip capacitor kit 12 each, 60 total! 18, 27, 39, 220, 470 pf only \$18.00
 - SMA and Type N connectors
 - .141" Semi-rigid coax \$3.45 per foot
 - 2 "x14" copper tube for Birkill feed. \$12.00

SATELLITE INNOVATIONS
P. O. Box 5673, Winston Salem, NC 27103

Add \$2.00 shipping and handling.

NEED PARTS...

Sat-tec's Got 'em!



SPUGGELIGATIONS

SPECIFICATIONS:
 Signal input 70 MHz at 20dbm(22mv)
 AFC lock range greater than 5 MHz
 Sound subcarriers 6.2 MHz and 6.8 MHz
 MHz fully independent
 Video level out std. 1 volt p-p
 Audio level out 1 volt p-p
 Power requirements 15VDC (ca 200 mA)
 Demodulator NF564 PLL IC
 Tuning voltage out 2 to 13.5 volts
 Tuning voltage in 0 to 15 volts max

70 MHz DEMODULATOR CARD
 The Sat-tec D-1 demodulator is the last block in a TVRO system, it is where the 70 MHz IF signal is converted to video and audio. The D-1 contains a PLL demodulator, video processor (CCIR de-emphasis, 4 MHz low pass filtering and 30 Hz clamp), dual sound sub-carrier demod and AFC circuitry. The power requirement is small, 15 VDC (< 200 mA., signal input is -20dbm \pm 70 MHz). AFC will enable the user to lock most any VTO L.O. with no problem whatsoever. Video and audio outputs are a standard 1 volt p-p suitable for driving any monitor, VTR or modulator.

D-1 Demodulator Kit	\$99.95
D-1 Demodulator PC board only	\$49.95
Part Number	Description
Avantek GPD 1002	1GHz, 12 db gain TO-8 can amplifier, 15 VDC
Watkins Johnson V802	2.5 3.7GHz VTO, lower noise than Avantek types
Watkins Johnson V705	600 1000MHz VTO, lower noise than Avantek
Signetics NF-564	PLL selected to operate at 70MHz
Van L. DBM 500	4GHz mixer, SMA connectors
Amperex ATF-417	1GHz, 25 db gain hybrid amplifier, 20-24VDC
Motorola MWA 110	400MHz, 14 db gain, -2.5dbm
Motorola MWA 120	400MHz, 14 db gain, +8dbm
Motorola MWA 220	600MHz, 10 db gain, +10.5dbm
Motorola MWA 230	600MHz, 10 db gain, +18.5dbm
Motorola MWA 310	1GHz, 8db gain, -3.5dbm
Motorola MWA 320	1GHz, 8db gain, +11.5dbm
Motorola BFR 90	3GHz F _T PNP transistor, 15dB gain @ 1.2GHz
Motorola MRF 901	3GHz F _T PNP like BFR 90 but 2 emitter leads
Regulators 7800 Series	5V, 8V, 12V, 15V, 1A TO-220
Regulators 7900 Series	5V, 8V, 12V, 15V, 1A TO-220
IF Transformer	10.7MHz IF can be padded to 6.2 or 6.8MHz
Tuning capacitor	10pf multi turn for filters, PLL, etc
Coil form + can set	Nice coil form set for filters, good to 120MHz



Sat-tec Systems; Box 10101
Rochester, NY 14610; (716)381-7265



TERMS AND CONDITIONS

COOP'S COMMENT ON PROGRAMMING

PRESSURES THAT BARE...

From almost the beginning of this publication there has been in our Programming Section, on a regular basis, a small 1/8th page advertisement from **SAT-GUIDE**; the folks out of Idaho who publish a monthly guide to all of the satellite programming on FI. David Wolford is the young man behind the publication and it has turned out to be a very valuable tool for virtually every part of the satellite business.

Cable operators subscribe because Sat-Guide keeps them up to date on the rapid proliferation of programming 'choices' they have available. Since cable systems pick and choose which satellite services they will offer to their subscribers Sat-Guide helps them keep a firm grip on what they are offering versus what they are not offering. I am sure many cable firms, after careful study of the monthly listings in Sat-Guide have reached the decision that certain services not being carried should be carried.

People just getting interested in satellite programming also find Sat-Guide invaluable because it sets out in hour by hour listings just how wide the satellite programming revolution is; at least on FI. I've seen copies in banker's hands, offices of politicians, would-be suppliers and I recently saw a copy on the bedside table for a chief executive officer of a country in the Caribbean.

People in our 'private terminal' business find it useful for a variety of reasons. As a 'selling tool' for home terminals, it is hard to beat. When you combine our STT dealer tape ('**The Satellite TV Story**') with a sample copy of Sat-Guide you have just about told the complete story to the would-be terminal buyer. Lots of the more savvy dealers subscribe to a dozen copies or more per month and use the extra copies as 'hand outs'. And that is good marketing. Users of private terminals of course find Sat-Guide just as handy as terrestrial viewers find **TV GUIDE**.

There is no advertisement in **CSD** this month for Sat-Guide.

Publisher Wolford would like there to be an advertisement here. But he knew from the beginning that even the small 1/8th page advertisement was dangerous. Early on, when he started the publication, he was told by certain executives at HBO "We will cooperate with you (they cooperate by providing the advance programming schedules) provided we don't see you promoting this as a tool for the 'illegal' home terminal users". Wolford talked with us about what this meant and we reminded him that if having HBO listed was important to him (it is) that Sat-Guide was certainly not making anything available (i.e. the HBO schedule) which was not generally available elsewhere. There are dozens of editions of **TV GUIDE** that now carry the complete HBO (plus SHOWTIME, Movie Channel, etc.) satellite schedules. And you can subscribe to **TV GUIDE** for less than half of the Sat-Guide fee. PLUS - you can walk into virtually any one of the 1,000 plus cable system offices where HBO is carried and pick up a free 'sample' of the current month HBO guide. Finally if you are a glutton for punishment, you can tune in HBO for a few minutes before they sign on each day and read off the screen the day's program listing as it rolls by.

So we told Wolford he was not 'breaching any security' when he published HBO listings; and we wouldn't worry about their threats.

Well, HBO was not making idle threats. One day in October an executive of HBO cornered Wolford waving about a recent issue of **CSD**. He had the page with Sat-Guide's small 1/8th page advertisement in it open. "**Get out of there or we get out of Sat-Guide**" he told Wolford. Wolford decided he had to get out of **CSD**.

We all know that HBO is paranoiac. They are currently under pressure in the cable industry by a chap named Irving Kahn (an influential cable leader) who has been telling fellow cable operators that HBO is 'too big for their britches' and that 'HBO needs some stiff competition'. HBO has not been happy with the recent mass-publicity in the **SUNDAY PARADE** (newspaper supplement) and in **NEWSWEEK**. A story that was scheduled for **TIME** magazine about home terminals never ran because...**TIME, INC.** is a major owner of HBO. That one ended up in **PARADE** even though it was written by a **TIME** Bureau Chief.

Everything we do (and say) is now carefully examined. Many of our actions, certainly our growth as a real honest-to-gosh industry is alarming the many foes of direct broadcasting satellites (DBS). The majority of the 'think-tank' folks refuse to believe that you can have a viable, cost-effective **4 GHz** DBS service. They are constantly selling themselves and each other on the **next** frontier; the **11/12 GHz** band where DBS will undoubtedly sprout along about 1988 or so. For now we can be glad they are staying away from 'our' industry since we need more 'get-it-done' performance people and not more 'let-us-stop-and-think-about-it' people involved in our activities.

I think Irving Kahn is right. HBO is too big for their britches. They have no business telling David Wolford how to publish his Sat-Guide and no business telling us they don't want our money and won't accept it when offered. And I predict all of this will catch up with them one day...soon.

CSD
PROGRAMMING

COOP'S SATELLITE DIGEST (Programming Section) is published monthly by Robert B. and Susan T. Cooper doing business as Satellite Television Technology (STT). Editorial offices located at West Indies Video, Grace Bay, Providenciales, Turks & Caicos, BWI. Communication with editorial office is through Business Office at P. O. Box G, Arcadia, OK 73007 (405-396-2574); Rick Schneringer, Manager. Photography, Kevin Paul Cooper; editorial assistance Tasha Anne Cooper. STT produces various manuals, videotapes, guides and texts plus conducts the twice annual SPTS and once-annual SBOC events. STT is not affiliated with any manufacturer or distributor of satellite communications equipment. **CSD** subscription \$50 per year US / Canada / Mexico; \$75 elsewhere. Total contents copyright 1980 STT, USA & Turks and Caicos.

BRINGING TV TO THE WEST INDIES [Part II]

GOSH THIS IS FUN!

I am by chemistry an impatient person not given to great understanding and compassion when things go wrong because of human error. And I am just as hard on myself for 'dumb mistakes' as I am on others around me.

It is therefore with some surprise and even pleasure that I notice that I have adjusted quite well to the '**no problem**' attitude of the Caribbean. One day late in September our extremely capable contractor Sam Lightbourne dropped in while we were feeding the evening news from a satellite connection to our viewers. Sam often does this because he likes to stay up with the world events so I thought little of his visit and went on instructing Kevin on the fine points of making a clean station ID, how to pre-roll tapes for the forthcoming programs and when the preview monitor showed the right spot switch the vertical interval switcher to the proper input line.

After the latest news on the then-current Iraq-Iran squabble Sam spoke up. "Say, Bob, have you got a minute mate?" Whenever Sam calls me 'mate' I listen closely because I have learned he saves 'mate' for a problem.

"Somebody made a mistaken on figuring out the annex and the house quotations" said Sam. I wondered what type of mistake knowing full well that it was not going to be in my favor. "Well, let's go inside and look at it" replied Sam. Several hours later I saw where the architect on Grand Turk had screwed up. We weren't going to be 'over budget' by much...**just \$125,000 or so!**

Well, since this is a cash project (you cannot borrow money to build houses down here; **period**) and we had liquidated our Oklahoma holdings to the nickle to make it work, this was obviously quite a problem. So we looked at how we could 'trim' \$125,000 out of a project budgeted for not much more than that to start with. By the time I got done taking out concrete and pilings and floor space to get back into budget with the two buildings we had one building and a tent. And the building left, the Annex, was largely dedicated to the West Indies Video operation plus providing an apartment type living situation for our guests. Humm.

Now the architect who created this error is something of a 'character'. A loveable 38 year old Canadian-Englishman with red hair, 100 pounds too much stomach and they tell me a \$2,000 per month bar bill. He fits the islands perfectly because he wouldn't fit in anyplace else; comfortably. He draws like I write; fast. Hopefully I make fewer mistakes writing than he does drawing however!

All weekend Sam and I tried different approaches to solving the problem. Sam really felt bad about the mess and I restrained my anger with the architect very well I thought. Sam quit calling me 'mate' in short order and returned to Bob which meant he was no longer nervous about it all. Sam hit the eventual solution; with the concrete foundation **already in place** for the Annex, we would simply place the 'big house' down on top of the Annex foundation, and turn the ground floor of the Annex into what the Annex was originally intended to be. We didn't start out with plans for a **two-story place** but we ended up with just such a building. It only fit one way however and without thinking far enough we spent a long Sunday



redrawing the plans of the big-house and the Annex to get them married into a two-story building.

Monday morning Sam was back bright and early; I was just taping the early morning satellite feed of a one hour news story for later play when he drove up. "Got a minute **Mate?**" he asked.

Well, the architect had done it again. He had our Annex base frightfully close to our western property line. "He may have been looking through a shot glass rather than a transit" suggested Sam as we stood on the sand dunes gazing at the problem. "If we overlap the Annex foundation now with the ten foot overhang required on the west side we'll be almost into the next lot". The lot restrictions wouldn't allow us within 20 feet of the next lot. "I can't figure out why we are so close to the edge of the lot in the first place when you have nearly 300 feet of beach" notes Sam. I decided it must be dumb luck.

So we spent another day shifting the 'big house' across the Annex to the eastern edge of the foundation; a less desirable direction for cost reasons but still workable. It had to work since we couldn't go west now.

We are learning something about operating a television station that I should have realized before hand. Ted Turner tried to tell me about it once and I didn't listen carefully enough. And that is, a television station, once it goes on the air, is there forever. Come rain or shine, sickness or health, better or worse. Everyday at the appointed hour that transmitter had better go on the air.

We've had no problems in that regard to date. If the island power service is off, everyone is off so we don't panic. But beyond that **general** situation, we always seem to hit the airwaves on time and get through the present abbreviated four hour evening telecasting day without too many hitches.

Around 5 PM we turn on the transmitter and run color bars. Sometimes we run a static 'super' reading 'West Indies Video / 4 Provo' across the bottom of the screen or we simply set up the character generator to roll 2 or 4 or 8 pages and we load it with announcements and promos. Then we go swimming for the last time that day knowing we have to be back to push some buttons at 5:59:30. Once or twice we came close to missing but by having the 6 PM tape of our first one hour show already pre-rolled and ready to punch and go you can swim right up to 5:58 or so and still make it! While the first hour news and feature program (taped earlier that day off of satellite) is running Susan serves us dinner and we watch the day's news with the rest of the island. By 6:55 either Kevin or I head into the temporary studio to check the satellite feed. One of the US networks runs their news at 6:30 and again at 7 PM and we take the 7 PM feed 'live' as it were and deliver it to our island. Before leaving Oklahoma we talked a local TV station into producing a set of around 30 super-quality 'squeeze zoom' promos and IDs for our West Indies Video and we drop one of these appropriate 30 second IDs in between the taped 60 minute program and the live satellite feed on 3/4" tape. Then we have just over 29 minutes to get ready to roll a taped sitcom at 7:30 followed by a feature movie at 8 PM.



EARLY WIV STUDIO / production facility consisted of electronics piled atop pieces of plywood laid across empty SONY cartons. Just getting real-live tables made a big difference in our attitude!

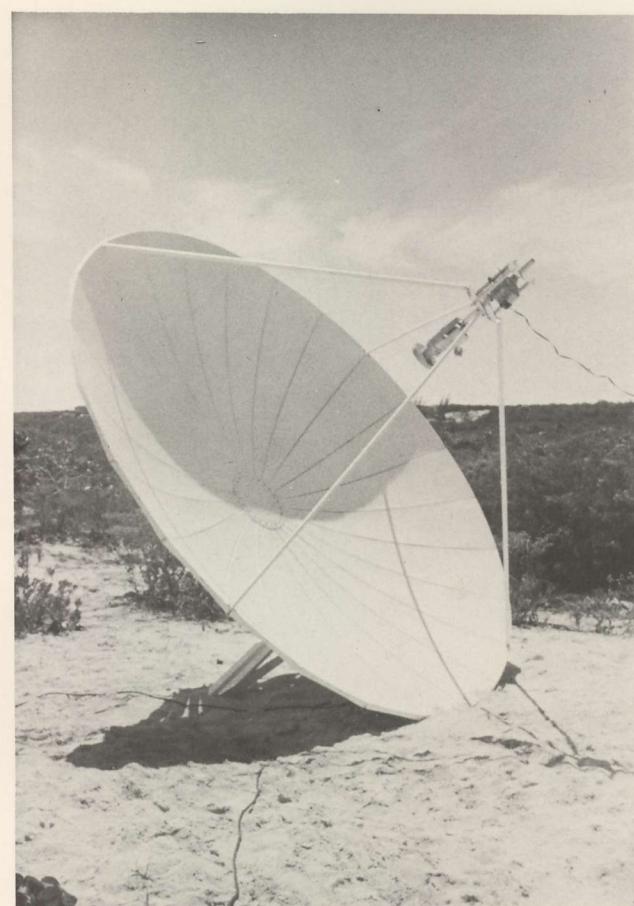
On weekends we jump around the satellite looking for the most interesting sporting event. This being football season, we select a football game both days and run it for the sports fans. We had been operating only two days when one of the hotel's ordered a five foot Sony KP-5000 for their bar.

A couple of afternoons per week we pack up the Sony 3/4" gear and Edmund and Kevin and I head out into the islands for some location shooting. We are working on three different 'specials' right now; one on the island's **power** system (hey-hey), another on the **telephone** system (double hey-hey) and a third on the **one bank** in the islands (lose my money will they!). We've been shooting lots of local color (the local super market the first morning after the weekly air cargo 'lift' of fresh food from Miami is quite a scene for example) and are working up a series of extended IDs using local people doing their thing right now. We always attract a crowd of people when we pop out of the West Indies Video Blazer armed with shotgun mikes, zoom lens and portable power and as these people have never seen television before they love to get 'on camera'.

Because we elected to make heavy use of 1/2" tape for canned programs brought down from the states and because our island powering system is an unstable 60 MHz to say the least, I have developed a new appreciation for the 1/2 inch formats. YES - when the 60 hertz AC supply wanders far away from 60 hertz the BETA format goes berserk **first**. But we solved that by investing \$2400 in a Topaz DC to AC sine-wave inverter that takes in 12 volt DC and creates a kW of 60 hertz AC for us. We run all of the tape decks, the NTSC (sync) generator and anything else frequency sensitive off of that Topaz unit. Everything else we run on 110 VAC fed out of the local 125 VAC service through Sola voltage stabilizing transformers.

One day when I was taping the daily one hour early AM news and feature program on VHS I decided to simultaneously tape it on BETA just to compare the two. Now I have been a VHS fan for several years; the frequency sensitivity of the BETA being a new problem that only re-enforced my conceptions about the superiority of VHS. Then I played the two back into separate channels on our ten channel input vertical interval switcher and into companion monitors. Humm. What was this? The BETA picture really **looked** better! So I took both machines apart and cleaned the heads sure the VHS was simply in need of some maintenance. The next day I repeated the episode with identical results. Still not convinced I was getting a square shot I swapped around and put another freshly head - cleaned VHS in the VHS spot. Same results again. As a confirmed VHS-is-superior man I could hardly believe my results. So I ran the BETA and the VHS straight out of the 110 VAC line (without the Topaz sine-wave AC) and did it again. This time the VHS was better. Humm.

I wonder if Sony realizes that the big reason they have



unhappy people out there who complain about glitchy pictures that flit around is because the world does not have a high quality 60 hertz line to work on. I mean... how many people ever really sit down and **confirm** they have 60 hertz in the states? I never did. I **trusted my power company** and that was that. Sure, I expected and protected against high line **voltage** and transients because virtually every power company has surges and switching spikes from time to time. But 60 hertz? Egads. That's as basic as the sun, moon and the stars. Or so I thought!

No, I have not given up using VHS. I figure the longer format and some obvious mechanical design features with VHS are still a good deal. But I am a **born-again believer in BETA** now that I have finally figured out why it didn't look as good to me on a **consistent** basis as VHS did in the states. One more thing... Kevin was the first to notice that when we ran BETA tapes that our character generator (which references to our sync generator for normal sync drive) was **rock stable** when inserting titles or announcements over the BETA video; while the VHS machines often (perhaps 75% of the time) jumped around quite a bit. Our Shintron generator adds titling after (or downstream from) the last video gear and just ahead of our modulator. It does so with good stability **provided** the sync in the video being fed through the Shintron is stable. If the sync is unstable, the 'supered' letters and numbers bounce around over a two or three character-line range. Clearly intolerable since few people can read letters that bounce up and down at something approximating a two hertz rate.

And since the **sync** in some of our satellite feeds is not all that stable (a combination of being slightly below receiver FM threshold on some signals and/or just lousy video engineering at the uplink site since they know once back on the ground the downlink site will strip the satellite sync and add new sync for ground re-use in most cases), we quickly discovered that the BETA recordings from the satellite were far more stable than the VHS recordings of the same program. So not only does the picture 'quality' **look** better (a subjective analysis I admit) but



the sync is more stable. It happens that the sync can be out of whack by a bit and the picture still **looks** stable on the screen (a function of the TV monitor or set vertical stability as well). BUT - when you run the same video through the Shintron down-stream titler, anything out of whack in the sync drives the Shintron product crazy. The titling just jumps all over the screen. BETA doesn't solve this completely - a bad set of satellite sync is still a bad set of satellite sync. But we found in direct comparison with the same program on VHS and BETA that where the VHS tape of a feed jumped about **through the titler** almost constantly we had only a brief glitch every minute or so on BETA. Bottom line? When it is **bad**, it is bad on both. When it is **objectionable** on a VHS tape it is still almost solid on a BETA tape. We **now** do all of our off-satellite recording on BETA or 3/4".

Big Night

Through all of this 'learning' the night of the Ali/Holmes fight will live in our memory for some time. People learn fast. "You have that satellite thing?" they asked. We admitted it. "Then you **CAN** get the Ali/Holmes title fight". We allowed as it was possible but not likely, trying to explain that the transmission of the closed circuit feeds for theater display was one of the best kept secrets in communications. 'And' we noted 'our temporary small satellite antenna only receives a good picture from three of the 11 or so satellites; the chances are not good that it will be on one of **those** birds'.

By the morning of October second I was plainly worried. Everyone we saw told us 'We'll be tuned in tonight'. I had an uneasy feeling about being deported even before we really got started. I scrouged up a not so hot tape of 'Rocky II' and scheduled it for 7 PM local time. I figured that would set the stage. Then Kevin loaded the character generator memory with every possible message we could think of in advance (i.e. "Don't call us - we are still working on finding the fight!"). We

decided to take the **6:30 PM** network news feed to make our schedule fit; for weeks it had fed at 6:30 **and** again at 7 and we had for scheduling purposes always chosen the 7 PM feed.

Just before 6 PM the telephone rang; again. The caller identified himself; a minister in the government. "I am bringing the Chief (same as 'Prime' or President) Minister over to watch the fight at 'the station' ". We asked him if he understood our odds were worse than Ali's odds; we possibly might not even find the bout. He said he understood. I said 'I hope the Prime Minister does...'.

At 6:30 we punched up the 'network line' from the satellite dish. We waited a long 15 seconds for the news to start. It did not. We were not prepared so it took us a very long 60 seconds to find, cue and start a standby 30 minute sitcom kept on the shelf for such purposes. Seconds after we began the sitcom a network DEF (direct electronic-news-feed) came down the satellite line.

Meanwhile I was reviewing, for the first real time, the 'Rocky II' tape. Good grief; the first three minutes had virtually no useable audio and it was not until the movie was perhaps ten minutes old that the audio cleared up. We might not be NBC but we had better standards than this. I had an idea about re-dubbing audio but that would take more time than we had. So we made a hip pocket decision and decided we'd let the sitcom run up to 7 PM; then if we saw the regular 7 PM news come up we'd go to it and delay the start of 'Rocky II' by 30 minutes. That would give me enough time to do some hurried audio dubbing.

The evening was not starting off very well. Before the sitcom had run up to 7 PM the 'guests' started to arrive. The phone was coming off the hook with callers. "Have you found it yet" they wanted to know. We kept running crawl supers across the bottom of the screen advising people we were looking; a half truth since our best intelligence (via Bob Behar



in Miami) told us not to even start looking until 9 PM.

At 7 PM the network news appeared on schedule and we ran it. By 7:30 I had enough of the audio on 'Rocky II' patched together plus a generous helping of supers and explanations to get us into the movie with a minimum of 'amateur-city' look. But getting Rocky on required running two tapes in as near to time-tandem as possible, switching from one to the other once and then back again as we tried to get 'around' the bad audio. Kevin learned a lot of new words from his father that night.

Edmund meanwhile was assigned the dish moving exercise. The yard was filling up and in the house Susan was already into her second pot of iced tea and the popcorn machine was running overtime. We treated everyone that dropped by as guests although our little entrepreneur Tasha wanted to 'sell' the popcorn and cold drinks. As soon as the satellite news feed ended Edmund was for moving the dish. "Surely they have camera setting up exercises and check outs before the fight?" he kept asking. I acted like I knew this was not the case but in truth I had never gone looking for a 'blacked out' **major event** like this before so I was flying blind. He won't know that until he reads this however and for now he thinks I know all of the answers!

After we got through the flying-in-tandem with a double set of tapes of 'Rocky II' the world cleared up. I decided that had to be the best 'meld' of programming anyone could create; a fantastic boxing movie followed by (we hoped) a super-hyped-fight. At 9 PM we spun through all of the channels on the WESTAR bird to be sure nothing was sneaking up on us there. One transponder threw us a curve; a static scene of Caesar's Palace; where the fight was scheduled. After a couple of minutes of watching the source dropped the feed (we decided it was a slide; not a live camera) and we went 'fishing' in earnest. Second stop was **another** WESTAR. There was the same static shot of Caesar's Palace again. Somebody had a strange sense of humor but we didn't bite. On finally to

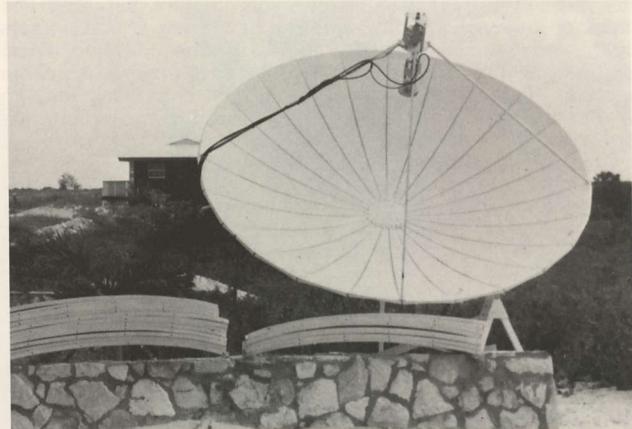
our highest in the sky bird COMSTAR D3. Bob Behar had said if everything else failed, we'd find a feed to Puerto Rico theaters there. Possibly in English; or Spanish. We knew what transponder to look on and by 9:05 PM we were locked up on the best quality picture you could ask for; my what a difference an extra couple of dB of signal level makes!

The fight was anti-climatic. After suffering through two preliminary bouts the ten round TKO left our largely Ali-rooting crowd disappointed; like millions of others around the world.

The Chief Minister and his party loved the event, sitting out on a make shift patio under the stars barely 15 feet from the 11' satellite antenna that provided the island with its first look at big time TV from the 'real world'.

After midnight as the crowd drifted away Edmund, Kevin and I wrestled the 11 footer back onto WESTAR for our early morning news program feed. As he tightened down his assigned set screw to lock the antenna up Kevin looked my way and smiled. "**We did it, Dad**".

That said it all.



REGULATION FOR SMALL CABLE SYSTEMS

UNDERSTANDING THE LAW

Many **CSD** readers have taken their own personal interest in satellite TV service reception and built from that foundation into a new business operation. Many readers have become dealers in TVRO equipment, others have become providers of various bits and pieces of hardware for users of the service and still others have addressed the 'commercial' or semi-commercial aspects of providing service to other people for a (monthly) service fee. Most who would provide satellite services to motels, hotels, apartment houses, condominiums, trailer courts or even small communities are aware that what they are in reality building is a 'small' cable television system. Those who attended SBOC in Houston listened and learned from **Tom**

Humpheries of Microwave Associates as he described the positive challenges offered by the 'commercial' marketplace. Others expressed dismay that when one installs a satellite receiving terminal which is to be shared by two or more users that several new areas of 'law' suddenly come into play.

There are two areas of law which one jumps into when one begins sharing satellite services. One is FCC law and the other is Copyright Law. Let's define both briefly and then look in some detail at the Copyright Law since it is perhaps the least understood of the two and potentially the most damaging if you fail to comply with its regulations.

The FCC...

The Federal Communications Commission maintains that when you share any broadcast television signals with other people for any type of fee, you are some form of cable television system. The key words here are '**broadcast television signals**', and '**any type of fee**'. Equally important is '**some form of cable television system**'.

An apartment house has a master antenna on the roof. Every television signal received by that antenna is considered (by FCC definition) a 'local' television signal. None are delivered by satellite, none come from 'distant markets'. The users of that antenna pay **no** fee to have their television sets connected to the master antenna; it is, like the plumbing, a part of the regular apartment fee. **The FCC says this is not a cable system.** Now that same antenna system charges a fee, no matter how small, for connection. Perhaps the master antenna is owned not by the apartment owner or operator but rather it is owned by an outside party. The outside party owns the equipment, maintains the equipment, and either directly (by individually invoicing the apartment dwellers) or indirectly (by invoicing the apartment owner and operator who then re-invoices the apartment dweller either as a separate charge or as a part of the 'lump' apartment charge fee) collects money for use of the system by the apartment dweller. **NOW** - the FCC says this is a cable television system of some form.

Change now to a condominium. The same rules apply **unless** the master antenna system is owned **by the condominium itself** or by the condo owners association. In these cases the master antenna system is not a cable system.

Change now to a trailer court. Here the FCC looks upon the system as a cable system **regardless of who owns it** since it is obviously not owned by the trailer court renters (they being largely transient and they rent space rather than own space in the court).

Change now to a hotel or motel. Here the FCC exempts the master antenna system from being classified as a cable system since the viewers are transient **even if there is a fee** attached to the room rent that directly or indirectly covers television reception.

Finally consider a very small system wherein you install a master antenna for yourself, and the rooms in your house. There is no charge to a second party so you are not a cable system by definition. **BUT - if you connect up one neighbor** to your system and there is any payment of any kind charged for your neighbor's use of the master antenna you have installed, the FCC **now** considers you to be a cable system.

Remember in our example the systems involved only provide service from **local TV stations**.

Now for the good news. If the total number of paying outlets in **any** of the above systems is 49 or fewer, the FCC considers you exempt from their rules. So while you may 'classify' as a cable system, the FCC says they don't want you to 'register' with them or make yourself known to them. However, if you have between 50 and 999 paying subscribers they do want you to 'register' with them; to make yourself known. Fortunately you are still **largely exempt** from their complicated rules; but there is a requirement that you file with the FCC a 'registration statement' so they can identify who you are and where you are and what television broadcast signals you are carrying on your 'system'. To comply with this requirement you should do two things:

- 1) Write a short letter to the **Cable Television Bureau**, Federal Communications Commission, 1919 M Street NW, Washington, DC 20554 and explain that you do (or expect to) serve 50 or more cable subscribers (**but fewer than 1,000**) and that you wish to receive instructions for

'registering' your cable service with them. They will send you instructions and forms.

- 2) Write a letter to the **Community Antenna Television Association** (4209 NW 23rd, Oklahoma City, OK 73107) telling this trade association group that you have a new 'small' cable television system and that you wish to know more about belonging to their group as a small CATV system operator.

Both of these steps are relatively painless. There are some substantial legal and monetary penalties for not contacting the FCC if you have 50 or more paying subscribers so don't let that one slide by.

We have used as our example a very simple system in which the **only** television broadcast signals you carry on your system are those which are 'local' to your area. Chances are if you are reading this synopsis in **CSD** you have an interest in providing signals that are **not** 'local' in nature (i.e. satellite delivered from some distant point) so let's see what happens to you the minute you start bringing in any non-local signals.

FIRST of all the FCC is only interested in you when you are operating a cable television system which provides (for some type of fee; no matter how that fee is collected or what form it is in) coaxial cable distribution of **broadcast signals**. What is a 'broadcast' signal? Any signal that is transmitted to the general public, through the airwaves, which is intended for reception by said general public without fee or charge. In other words, television stations licensed by the FCC (or some other body in an adjacent country such as Canada or Mexico) that provide service to anyone with a receiver to pick them up.

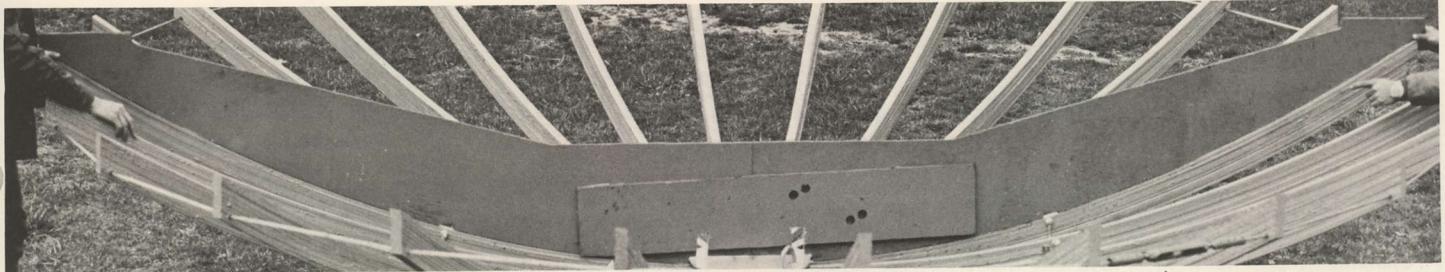
What happens with other types of signals? Well, until satellites came along there were virtually no other types of signals available. Now we have several categories. But they all lump together at the FCC where they are 'non-broadcast' services. HBO, PTL, CNN, ESPN and C-SPAN are about as different as day and night. But in the FCC view **all** are non-broadcast services. How does that impact on you?

If you build a satellite receiving system to **only** take **non**-broadcast signals off of the bird(s) and you plug those signals into a coaxial cable system for which you charge a fee, the FCC does **not** want to hear from you. You are not, by definition, a cable television system since you are **not carrying** the one type of signal which they insist you 'must' carry if you are to be considered a 'cable television service'. And that is a broadcast signal.

Now suppose you decide 'as a free service' to marry onto your cable distribution system the local TV signals **plus** the satellite non-broadcast services? Well, you just became a cable system. What if you **tell** everyone that the local broadcast signals are not being charged for, at all; that they are 'free'? It **won't work**. The FCC says that if you are charging a flat fee for a service, that every signal being carried by you is contributing to the total fee and that you cannot simply 'send along' the local broadcast signals 'free' as it were.

Now suppose you decide to leave **off** the local TV signals but you decide to carry Super 17 (or WOR or WGN or KTVU - as long as it is up there - or Trinity Broadcasting's KTBN)? Well, these are all broadcast signals because they are transmitted from their towers to the general public for off-the-air reception. Sure you get the signal(s) via satellite, but by definition the signals are broadcast so the method of delivery does not count. And you are back to being a cable system by FCC definition all over again. Furthermore, if you elect to carry **one** or more such 'distant' broadcast signals on your cable system, the FCC says you must then automatically **ALSO carry all** of the local signals as well. This is called 'Mandatory Signal Carriage' and it applies to all cable systems with 50 or more subscribers. It simply means if you fit their definition of a cable system you cannot pick and choose **which** broadcast signals you wish to carry. You have to carry every single one of the local ones and that includes the UHF signals as well.

BUT (you say) what happens if I elect to build a coaxial cable distribution system which I operate as a business, but which does **not carry** anything but **non**-broadcast signals? Here's what happens. You can run this business without even telling the feds about it since you are not by definition a cable television system.



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ET/3.66 (12 foot) Antenna Gain = 41.1 dBi, which means that the following satellite "EIRP minimums" are achieved:

Required CNR (dB)	SNR (dB)	EIRP Minimum [dBw]	
		w/120°K	w/100°K
8.0	46.6	32.0	31.4
9.0	47.6	33.0	32.4
10.0	48.6	34.0	33.4
12.0	50.6	36.0	35.4

ET/4.85 (15.9 foot) Antenna Gain = 43.5 dBi, which means that the following satellite "EIRP minimums" are achieved:

Required CNR (dB)	SNR (dB)	EIRP Minimum [dBw]	
		w/120°K	w/100°K
8.0	46.6	29.6	29.0
9.0	47.6	30.6	30.0
10.0	48.6	31.6	31.0
12.0	50.6	33.6	33.0



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NOTE: The presence of numerous subcarriers on some satellite transponders can raise the EIRP minimums 1.5 to 2 dB.

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Mid-Continent Earth Stations - Lincoln, Nebraska - 402/476-2211
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Satellite Cable Company - Pocatello, Idaho - 208/232-2606
CFP Enterprises - Horseheads, N.Y. - 607/739-2027
EARTHSTAR Corp. - S. Chicago Hts., Ill. - 312/755-5400

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James K. Vines, President

Merle B. Smith, Vice-President

PARAFRAME, Inc.
P. O. Box 423
1000 Sunset Drive West
Monee, Illinois 60449
Ph. 312/534-7435

Just for the record here are the signals via satellite you could carry (assuming you have obtained the permission of the program service operator to use or carry his service) on such a system:

- 1) **Religious signals** - PTL, CBN (but not Trinity since it is in fact a relay of a broadcast signal through or from Corona, California's KTBN operating there on channel 40);
- 2) **Premium movie services** - HBO, CINEMAX, SHOWTIME, The Movie Channel, Home Theater Network, and others still on the drawing boards.
- 3) **Speciality services** - ESPN, C-SPAN, USA Network, BET, Nickelodeon, CNN, ACSN, and SPN.

What about SIN (Spanish International Network)? The SIN satellite feed is a mixed bag of broadcast signal services (from San Antonio's KWEX and others) **and** direct feeds not at that point ready for re-transmission by terrestrial services. The vote is still out on SIN although the FCC seems at the moment to largely consider it a **non**-broadcast service.

What about the COMSTAR D2 services? If they are not being broadcast to the general public then they too will fit the format. What about ANIK B, WESTAR and other services? Again, the key element here is that you must obtain the **authorization** of the service owner to carry their signals on your system. This is an FCC requirement that has very little to do with the cable TV status question but it must be remembered none the less.

And Now Copyright

To some the FCC definition business may seem confusing. Read it over several times; it will sink in eventually. It is however a 'piece of cake' when compared to the U.S. Copyright Law requirements.

On October 19, 1976 a new Copyright Act was signed into law. This 'Act' replaced one that had been with us since 1909, long before the appearance of cable television or even television service. That law made sweeping changes in the legal requirements of just about every aspect of the information dissemination business.

Under the new Act **all cable television systems** are required to pay copyright fees for carriage of television broadcast signals.

How sweeping is this?

Let's return to our earlier examples. We have an apartment house with a master antenna. The master antenna system provides only service from local (broadcast) signals and there is **no direct charge** for the use of the antenna. Under the Copyright Act this is **NOT** a cable television system. Now add **one** non-local broadcast signal, whether it is a 100 mile distant terrestrial signal or a satellite signal. If no **direct** charge (whether by invoice or as built into the rental fee no matter how carefully it is hidden) is made, you are still not a cable system for Copyright Act purposes.

Now let's charge something (anything, again no matter how cleverly hidden) for the distant signal (again, whether picked up off the air with an antenna or received through satellite). **NOW** - the Copyright Act says you are (for their purposes) a cable television system.

Condominiums? The same rule applies. If a fee is charged and **any** distant signals are involved, you are a cable system.

Trailer court? Copyright, like the FCC, says that a fee is always charged so you are indeed a cable system.

Hotel or motel? Again, like the FCC definition, you are exempt because of the non-permanent status of the residents.

Finally the very small system wherein you install say a satellite antenna in your yard and then hook up **one** neighbor (or more). If any form of charge is made, **including cost sharing**, you are now a cable system for Copyright Act purposes.

Now what about the size of your operation? Remember that the FCC exempts you from any registration or rules if you have **49 or fewer** subscribers to your service. Well, the Copyright Act is not so kind. If you have **one or more** paying subscribers (as they define payment which simply says **any** form of payment) the Copyright Act makes you liable for reporting your existence and payment of certain fees to the Registrar's office!

What about the nature of your signals? Again, similar to

the FCC rules, if you carry no 'broadcast signals' the Copyright Act does not address you. But as soon as you carry **ONE** such signal **and** there is payment of **any** kind...well, you just became a Cable Television System under the definitions of the 1976 Copyright Act.

Before we see what this Act requires of you let's look at the picture once again in synopsis form:

- 1) **You carry no 'broadcast signals'**, local or distant: Both the Copyright Act and the FCC agree that you are not a cable television system and they ignore you. There is no limit on your size (of system); you can get as big as you wish and no body cares at the federal level.
- 2) **You have 49 or fewer subscribers** and you carry only broadcast signals. The FCC says you are exempt from their rules. The Copyright Act wants you to register and pay a fee. Neither care what signals you carry and as far as the FCC is concerned you do not have to carry any local signals if you don't wish to do so; or you can pick a couple of local signals plus a couple of satellite signals. However **any** satellite signals you do carry must be carried **only after** you obtain the authorization of the satellite signal owner. If you elect to do this and you have some difficulty getting the attention of the satellite signal operator (because of your size) send them a copy of your Copyright Office registration form which will prove to the satellite signal operator that you are a bona fide 'Cable TV System'. If they still refuse to deal with you, you may be able to complain to the FCC since many satellite signal operators are governed by FCC Common Carrier Rules and under these rules they cannot refuse to provide you with service when you request same and when you are willing to pay their published tariff fees.
- 3) **You have 49 or fewer subscribers** and you elect to carry both broadcast and non broadcast signals. The Copyright Act wants you to register with them, the FCC still does not. Signal selection does not play a part at this level.
- 4) You have 50 or more subscribers and you elect to carry either **only** broadcast signals or you elect to carry broadcast **plus** non-broadcast signals. The Copyright Office wants you to register and the FCC wants you to register. The Copyright Office does not care **what** signals you carry but the FCC says you **MUST** carry all local signals if you carry **ANY** broadcast signals. And that includes UHF channels as well as VHF channels; commercial and non-commercial.
- 5) **You have 1,000 or more subscribers** and you elect to carry either only broadcast signals or broadcast and non-broadcast signals. Now you are in the big leagues and both the FCC and the Copyright Office want to hear from you. Your FCC life will now become so interesting you'll probably have to hire an attorney to represent you in Washington, D.C. while your Copyright life will begin to get very complicated simply because as you pass the 1,000 (to 1,500) subscriber mark you start taking in substantial amounts of money annually. The Copyright fees charged to you are minimal only as long as your gross income falls **below** a magic number of \$41,500 per six months (\$83,000 per year). Once you get over that figure you need a Chinese accountant with a computer to keep track of what you owe the Copyright folks. If you are really getting into that league we suggest you write to the **National Cable Television Association** (918 16th Street NW, Washington, D.C. 20006) and ask for help. You'll need it!

So where are the 'safe zones'?

- 1) **Don't carry** any broadcast signals.
- 2) Or, if you system carries any, **don't charge** (at all in any way) for the service.
- 3) Or, **stay below 50 subscribers** (stay out of the FCC's way) and charge what you like and carry what you like but accept that you need to register with the Copyright Office and pay a minimal annual fee and fill out a few pieces of paper every six months.

More - Copyright

As much as most independent people (you are probably one or you would not be reading this) dis-like federal intrusion

into their lives, the Copyright Law definition of what you are doing may be a blessing in disguise. As we shall shortly see, being called a 'cable system' by them is not all that much of a hassle. And it has one very important side benefit.

One of the primary contentions kicked around us by the satellite programmers who **don't like** 'private terminals' is that we do not fit into their grand 'cable-scheme' of things. "**You want permission to watch WTBS?**" the man asks. 'Yes' you reply. '**But you are not a cable system and according to our FCC filed tariffs we cannot serve individual homes**' he shoots back. 'Wrong' say you 'here is a copy of my Copyright Office registration and as you can plainly see I am a cable system'.

The man smiles. He knows that you've got him but he is not done yet. He also knows that by law he cannot refuse service to your cable company (we'll see who that applies to shortly) since he is a Common Carrier and must accept service 'orders' from any 'qualified' cable firm.

"**Well, I see your Copyright Registration. Now let me see your FCC registration!**" You tell him that because you have fewer than 50 subscribers you don't need one; you are exempt from FCC registration. He smiles again, with one more ace up his sleeve. "**Well, you understand that WTBS has a minimum service tariff; that the FCC has approved a minimum fee of \$60 per year for our service and it must be paid in advance all at once**". He figures you are not about to pay \$60 per year for your 'small' cable system. **BUT** - if you are willing, well, he cannot long deny you service. Not if you threaten to take him to the FCC for failing to supply you with an agreement to take the service.

The \$60 per year minimum (which WGN and WOR also have through their respective Common Carriers) was arrived at in this fashion. **By FCC definition a cable system starts at 50 homes.** The common tariff is actually ten cents per home per month. At 50 homes that is 50×10 cents or \$5 per month. And over 12 months, that is \$60 per year. That's how it works. They want you to pay in advance because they cannot afford to keep a month by month file record of you, invoice you each month and then post your record sheet for \$5 per month.

The Common Carrier services so affected are those

bringing up WOR, WGN, WTBS and for the time being KTVU. HBO, SHOWTIME, The Movie Channel et al are carried on the satellite by a Common Carrier but it is not the Common Carrier whom you deal with when you want their service. Rather it is the programming company directly. So unlike WOR/WGN/WTBS who cannot refuse you service if (1) you are a 'cable system' (your Copyright Office registration says you are one, right?) and (2) you are willing to pay the tariff fee, this batch of services **can refuse you service** if they decide they don't like the way you look.

Now the 'way you look' to them is more important than what you really are. With the exception of The Movie Channel (who takes money from anyone willing to pay) they will not accept you as an 'affiliate' unless they can justify who you look like you are to the movie firms from whom they buy service (i.e. films). If 500 'small cable systems' suddenly appeared on the HBO 'rolls' the movie firms would immediately jump up and down shouting "**Aah-hah! We caught you serving private homes!!!**". So merely being a cable 'system' in the eyes of the Copyright Office probably **won't** get you a service agreement with HBO or SHOWTIME. But...if you happen to be a cable system in both the eyes of the Copyright Office **and** the FCC (i.e. 50 or more subscribers), then your chances of getting HBO or SHOWTIME affiliation is very good indeed. And at 'wholesale rates'.

What's that all about?

HBO and SHOWTIME routinely charge around \$4 (it varies slightly from that in individual situations) per month per home served. That's the fee they charge the affiliate directly. Let's say **you charge** \$8.00 per month for HBO and you have 50 homes served. That works out to your sending HBO \$200 a month and you keeping \$200. Which happens to be the same thing as say 25 families, each owning a 'share' of the cable system (an equal share with the full system costs split 25 ways), paying \$8.00 a month directly to HBO (through one central cable system 'office'). Again, what you 'appear to be' is more important perhaps than what you actually are.

The bottom line is that if you happen to have only Copyright Office registration, you can probably only get

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PRICES: Reflector and frame: \$795
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THEY CALL THIS BIRD MOLNIYA



A whole family of Russian satellites circling over North America and beaming live Russian television back into the USSR. Now because STT has researched the Molniya reception challenge and developed hardware modifications and software systems to produce high quality Russian television throughout North America, you can share in the excitement of this ultimate satellite TV fantasy!

Until you have witnessed Russia's approach to national television service, you cannot appreciate how fortunate we are to have a multi-channel national service of our own!

STT has put together a 90 minute (approximate) special videotape that explains in great detail how you set up to receive the Russian Molniya transmissions. All of the technical changes required plus a thorough understanding of the unusual moving/inclined-orbit of the Molniya series birds is explained in this special tape.

PLUS - this tape includes a report on the San Jose SPTS reception of Molniya **and** an interview conducted at STT in mid-July with English experimenter Steve Birkill who pioneered reception from both Molniya and Russia's Ghorizont Clarke-orbit birds.

STT videotape THS-1 is available for immediate shipment. Specify VHS or BETA format. Price \$60 postage paid US and Canada; \$65 (US funds) outside of US Canada.

STT P.O. Box G, Arcadia, OK 73007 405/396-2574

affiliation agreements from those Common Carriers who are required by law to serve any qualified applicants (willing to pay the fees) or from those who don't play the number games; such as PTL, CBN and a few others.

There is the obvious grey area of building a system to serve a condominium where you elect to not be a cable system **by anyone's definition**. That is, you elect to install a system (which let's assume will serve more than 50 subscribers) **without carrying any 'broadcast' signals**. Now by theory, no-one is forced to deal with you at all. HBO et al can tell you to go fly a satellite dish and as we learned in Houston during the Tom Humphries session they may well do this because they don't want to affiliate with you and then possibly lose out to a local cable system that gets upset with their affiliating with you. The bottom line in this area seems to be that you may have to do some real work to get affiliation agreements with satellite programmers **if you are putting in a condo or apartment or hotel or motel system inside somebody else's cable 'franchise' area**. The programming services would love to have you as paying customers (200 units is 200 units) but they are not about to jeopardize signing an affiliation agreement with a firm that could wire the whole town (with thousands of potential subscribers) just to pick up 200 from you for a short term period.

On the other hand if your condo or apartment or whatever is **outside** of someone's franchise area and there is no early prospect of anyone getting the franchise for that area, then your chances for an affiliation agreement are good for your 'small, stand-alone' cable TV system.

Still More - Copyright

Now let's dispose of the regulatory maise surrounding complying with the Copyright Law of 1976.

To begin carrying broadcast television signals on your cable television system (remember if you serve **one or more paying customers** you **are** a cable system under the Copyright Law) you must notify the United States Copyright Office of your intention to do so 30 days prior to beginning such service.

The 1976 Law establishes something called a 'compulsory license' for cable systems. That means the copyright owner has no legal right to deny you use of his product, provided you get that product through the services of a television broadcast station. It also means that the 'price you pay' to use this product is set by law and he cannot demand that you pay a larger amount for it than established by law.

Here is how it works mechanically:

1) **You must write a letter** to the Licensing Division, Copyright Office, Library of Congress, Washington, D.C. 20557.

2) **That letter** must contain the following information:

A) The name and full mailing address of your cable TV system (i.e. "Our firm's name is XXX and our mailing address is 129 Main Street, etc.").

B) The **identity** and address of the owner of the cable system (i.e. "This cable system is owned by XXX and his ((the)) address of XXX is 129 Main Street, etc.").

C) The full list of all **broadcast** television signals carried by the system (i.e. "We carry stations WXXX-TV, channel 2, Bangor Maine, and, etc."). Note that you do NOT report any NON-broadcast services (i.e. PTL).

D) A description of the **'area served'** by the cable system. When it is an incorporated community, you simply state "within the corporate limits of Jonesville, Montana" or whatever is proper. When it is a small area not legally defined by an incorporated political sub-division you detail as best you can. For example "The Harbor View Condominium Complex" or "Seven homes located along Jones Road from approximately 1.9 miles north of Jonesville to 2.4 miles north of Jonesville".

E) The letter must be **signed** by the party preparing the letter and if that party is different than the owner of the system listed in the first data then under the signature and the printed or typed name of the individual it must say "authorized representative". If seven neighbors jointly own the system, and one

person is the spokesperson for the group, he or she then becomes the 'authorized representative'.

At the top of this letter you must **also** put in large letters 'INITIAL NOTICE'. And in the opening paragraph describing the full name and mailing address of the cable system also spell out the date when you expect to inaugurate service (make sure it is 30 days or more **after** the date on your letter body) and state how many homes will be served.

Mail this letter to the address given and we suggest you send it via certified mail. Retain a copy of this letter in your files. Eventually, not soon, you will receive back from the Copyright Office form CS/SA-1, the so-called 'short form' for reporting semi-annual gross receipts.

Here is what this involves. If you are taking in, for regular television service, less than \$41,500.01 per six months (that works out to \$6916.66 per month which also works out to 691 subscribers paying you \$10 per month), you will be charged a flat fee of **\$15 per six months** (or \$30.00 per year). The six month periods run from January 1 to June 30th and July 1 to December 31 with new forms sent out for the just-passed six month period around the end of each period. You typically have 60 days to complete the forms and return your \$15 cashier's check, money order or certified check.

Now that seems like a simple enough way to comply with the rules but as you might suspect there is more to it.

First of all, if you **change** anything (the ownership or the broadcast signals being carried) you must notify the Copyright Office within 30 days of the change or you stand to lose your compulsory license. If the ownership changes, you must list the name or entity which formerly owned the cable system ("Our former owner was John Jones...") and then give the same information for the new owner ("and our new owner is Tom Jones..."). You must also tell them the date such a change occurred ("This occurred on March 31st...") but make sure the date of change is within 30 days of your letter date since you by law only have 30 days to so advise them. Secondly, if there is a change in the signals you are carrying (again - only **broadcast** signals apply) you have to list both any stations that have been deleted from carriage ("We **were** carrying station WXXX-TV, channel 2 Bangor, Me. until March 31st") and signals that have been added ("As of March 31st we are now carrying WTBS, channel 17, Atlanta, Ga.").

Believe it or not you do NOT have to notify them if changes occur in the name of the cable service or if the call letters change (same station, new call letters) or if there are changes in the names of the communities served. This will be done by you automatically when you file your **next** semi-annual form CS/SA-1.

Now if you happen to be into the leagues where you will be taking in more than \$41,500 each six months, you will also be into a much more complicated filing procedure on a semi-annual basis. Larger systems make payments based upon something called "Distant Signal Equivalents" or DSEs as they are known. The bottom line here is that non-local **independent** broadcast signals (such as WTBS if you are in Maine) cost you more per signal than say a local signal would cost. We mention this so you have no false allusions about complying with copyright if you plan to bat in the big leagues. You'll need some professional, legal help here.

Finally, there is the matter of charges. **It may be** that you can take in **more than** \$41,500 each six months and still not get out of the \$15 per six months compulsory 'minimum fee' league. How is that?

Let's assume you charge \$15 per month for your service in your condo. That \$15 is **broken down** as \$8 for a premium service channel, \$4 for use of a converter and \$3 for 'local broadcast' signals. And this is exactly how every invoice you tender reads.

Now under the Copyright Act, you automatically take out the \$8 for the premium service since it is not a broadcast signal. That gets you down to \$7 per month. Now if you are using converters (to translate say mid-band channels to a standard VHF channel) to allow subscribers to watch any **non**-broadcast services carried by you on your system in mid-band, then you can also knock off the \$4 per month converter charge. And that gets you down to \$3 per month to report on a semi-annual basis to the copyright folks.

TVRO SYSTEMS

SYSTEM I - Prodelin 15' Antenna — Microwave Assoc. VR-4X Receiver. Two Avantek 4215 LNA's. Video Tape Recorder Modulator. Cables

Dealer Cost \$13,950.00

SYSTEM II - Prodelin 12' Antenna — remaining equipment same as System I.

Dealer Cost \$12,700.00

SYSTEM III - Prodelin 10' Antenna — remaining equipment same as System I.

Dealer Cost \$9,990.00

SYSTEM IV - Microwave Assoc. VR-3XT Receiver. Prodelin 10' Antenna. one Avantek 4215 LNA. Modulator. Cables

Dealer Cost \$6,995.00

SYSTEM V - SAT-TEC R-1 Receiver. Prodelin 10' Antenna. one Avantek 4215 LNA. Modulator. Cables

Dealer Cost \$4,995.00

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713 776-0542

SBOC '80 REPORT — JANUARY CSD

The key here is to **separately list on each invoice**, as well as on your printed literature, how your service fees break down. Then you must be sure that when there is a separate fee charged for the converter is used **only** to add to the subscriber service **non-broadcast channels of service**. You **cannot** subtract out the converter fee if you are carrying one (or more) 'broadcast channels' which the converter must be used for if the subscriber is going to receive those channels.

Can you break it down further? Suppose you have 12 standard VHF channels plus three mid-band channels. The 3 mid-band are all non-broadcast (let's say for example purposes they are used for HBO, Nickelodeon and CNN). Now suppose you have **in the 12 standard VHF dial positions** 8 'broadcast signals' plus four **non**-broadcast signals. Can you take the \$3 fee from our example (as charged for the reception service from 12 standard channels) and split it \$1.00 for the four non-broadcast signals and \$2.00 for the broadcast signals; thereby reducing your copyright liability to \$2.00 per outlet per month?

You can **ONLY** if you submit to your customers a **separate** invoice for the \$2.00 8-channel service **and they pay you not with ONE check but with two checks**. Since this is not likely to be acceptable to your customers, few will take advantage of this technique.

Summary

If you have your home and another home connected to your TVRO, **you are a cable TV system** in the eyes of the Copyright Office; provided one party has or is paying for the service. It only takes one party paying to make you a cable system and payment can be one time (i.e. split the costs) initially plus maintenance (also splitting the costs) or it can be on a flat monthly fee (no matter how small or in what

form; a sack of onions is payment in their eyes!).

Being a cable system in the eyes of the Copyright Office gives you certain 'legal' rights with Common Carriers who are required by law and their FCC filed tariffs to provide service to anyone who legally qualifies. It does not give you any rights with programming services not directly sold by Common Carriers (i.e. HBO et al) but it may establish you in their eyes as a user distinct and different from the dreaded 'private terminal viewer' class which they so fear.

Copyright fees of \$30 per year are not a big burden although paying \$60 per year for two families to legally watch WTBS may seem on the high side. However if you fall or can fall into an 'intermediate' small system class in the 30-50 home region you may find that some of the special services on SATCOM will be willing to deal with you, as a legal user of their service, and at the preferred 'wholesale' or 'cable operator' rate. When you compare the cable-service retail rates to the wholesale rates you may find that in this 'intermediate' range you are better off financially to get and share the wholesale rates with your subscribers then your cousins in the city are when they pay the straight retail rates for their cable services.

PROGRAMMING CORRESPONDENCE

START A LOCAL GROUP

The May issue of CSD suggested that if there were enthusiasts who would like to get local groups started (we hesitate to use the word 'club' but it does fit) we would be pleased to publish a listing now and again so that others in the area could make contact and start setting up such groups. Here are the first batch:

- 1) **New Albany, Indiana** - Terry W. Cheek, 1679 Roselawn Avenue, 47150.
- 2) **Broken Arrow, Oklahoma** - Charles Noble, 609 W. Fredricksburg, 74012.

NOT IN WINDHOEK

I read with great interest Coop's "Satellite TV Primer" in 73 Magazine for November 1979. This country is one of the very few left in the world with no television service; nor does it appear likely that we shall have TV in the foreseeable future. South West Africa does have a population of around 1,000,000 people. A firm from Los Angeles, Thunder Compute, is looking for a sales representative in our country and they offer a line of satellite TV terminals. Can you tell us anything about this firm?

G. H. Cohen
P. O. Box 11310
Klein Windhoek 9105
South West Africa

While nations such as SWA are not wealthy and the standard of living may be low by American standards, the fact that there is no TV there at all plus the reality that even in a poor country some people can afford a terminal should suggest to suppliers reading this that they contact Mr. Cohen. Remember fellows that in that part of the world, reception is

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PLUS - the Cadillac of LNAs from AMPLICA! **Each LNA** has factory check-out data sheet showing **exact** specs (some LNAs intended for consumer use are 'bulk rated' so you are not sure what you are getting). Quantity pricing on LNAs and 217 cable assemblies available - inquire!

AVCOM of Virginia, Inc. • (804/320-4439)
10139 Apache Rd., Richmond, VA 23235

COOP'S SATELLITE DIGEST

P13-12/80

limited (for the moment) to INTELSAT feeds (see Steve Birkill's discussion in the Programming Section of the June CSD) and this suggests 16-20 foot antennas, 120 LNAs, and a typical PLL receiver (with right hand circular feed on the dish).

MARKETING IN NEBRASKA

We are venturing into the satellite private terminal marketing area after sending a representative to the Miami SPTS. While at Miami he contacted each of the firms exhibiting there and based upon his report we have purchased an initial system from Starview Systems. I am most grateful for Coop's easy writing ability. I thought the 'Home Satellite TV Reception Handbook' made everything quite clear; please give yourselves a pat on the back from one of the newer marketeers of home terminals in the United States.

Russell Dodworth
Dodworth & Sons
Lincoln, Nebraska 68507

These chaps run a 'farm store' which sounds like an ideal type of outlet for reasonably priced private terminals. We look forward to the day when one of the hardware manufacturers in this field realizes that the biggest step they could take would be to put an antenna on a trailer and put a man on the road calling on farm implement dealers all across the rural states. That's how we'd get a new marketing program for a new TVRO hardware line off the ground in one big hurry!

TERMINALS IN EUROPE?

We plan to market low cost private satellite TV receiving terminals in Scandinavia this year. To help educate the Europeans into the potential for low cost satellite terminals, as has been done in North America by STT, we intend to hold a satellite seminar in mid 1981 in Sweden. Special emphasis will be on future products and developments. There will be a registration fee of \$150 payable in advance. At this point we are interested in hearing from people in this field who might be interested in attending as well as exhibiting in Sweden this coming summer.

Bo Nielsen
Sinus Electronic
Box 48065
S-400 77
Goteborg, Sweden

There is no stopping this revolution! We are not sure Europe is ready for low cost terminals yet although we are aware of a few that are in and operating. The primary problem is a lack of 4 GHz signals with sufficient footprint power to make it possible for anything smaller than say a 20 foot dish to play. The only bird that covers Europe on 4 GHz with good signals is the Russian Ghorizont series (14 degrees west) and that one immediately brings up the propaganda and political problems. The Europeans are pushing ahead with 11/12 GHz (downlink) receiving systems in anticipation of operational birds in this band in the next two to three years and when the higher power higher band birds do get operating there we'll have a real explosion. Anyone thinking about a trip to Europe might check with these fellows anyhow.

A DISH GROWS IN BROOKLYN

I wanted to drop you a line to thank you for getting me hooked onto one of the most interesting endeavors I have ever undertaken; assembling and operating a home TVRO system. I have amassed an ever expanding library of STT manuals, STT seminar video tapes, manufacturers literature and programming guides. Along with your STT seminars I have learned more about satellite technology than I ever imagined I could. As you can see in the enclosed pictures more than trees grow in Brooklyn! Even in congested New York City I have had no problem in receiving excellent pictures with my 11 foot ADM satellite antenna atop my roof (!). Yes, it took some special care and pre-thought but it can be done with excellent results. If any others in the northeast or New York City area in particular who

need some assistance with their system planning, I'll be glad to make my installation available for training. Looking forward to seeing you at the next seminar.

John G. Flynn
JF Electronics
30 Manhatten Court
Brooklyn, N.Y. 11223



John discovered satellites just prior to SPTS San Jose and came to California hoping he could put in an installation to receive even an hour or two of Irish television via Intelsat from Brooklyn, per week. We suspect he's still working on that problem and are delighted to see he is up and running with a domestic system from downtown Brooklyn. Can you spot his dish in the picture?

WANTS SATELLITE

I am comparable neophyte in electronics but became interested in satellite TV as we live west of Salem, Oregon with a mountain between us and Portland. The town has cable but not out here. We get only two channels (terrible!) and that leaves us with no CBS service. I feel that network TV is indeed a vast wasteland but some of the sporting events and the programs like Sesame Street are worthwhile. I have an adopted, deaf daughter and we are using video tapes and taped sign language instructions from the Oregon State School For The Deaf. We are in line to get one of the new 'closed captioning system decoders' for our Laura hoping that it will work on the programs we do get. The right answer for us would seem to be a home satellite terminal. I attended the SPTS in San Jose and subscribe to CSD. I appreciate your reports on equipment and the honest way of reporting and writing. I am considering a 12 foot Vidiark spherical antenna, an Avantek 120 degree LNA and a Sat-tec receiver. What do you think of this package? Will it work OK for me? By the way, I really enjoyed 'young Coop' at the San Jose conference; he's a very helpful guy!

Wm S. Mayhall
Salem, Oregon 97301

Anyone 'into' electronics, even if a neophyte, should have no difficulties with the package you have selected. The 12 foot spherical will produce good signal levels in Oregon and the 120 degree LNA is the right choice. We've written repeatedly about the Sat-tec R2 receiver and feel it is a good buy for the money. With the new R2A version the picture quality is considerably improved.

HOLIDEX?

In the August CSD there is a listing of some of the telco type audio carriers found on birds such as F1; transponder 15. I found, as listed, the Holidex audio for outward bound calls on

1672 kHz but cannot find the return channel. Is there any 'pattern' to the separations between the two-way channels (such as being so many kHz apart)?

R. G. Talbot
Moraga, CA 94566

A reminder to all that there are unresolved legal questions about as to the interception and 'use' of private communications. We 'know' that the return Holidex inward bound lines should be someplace up there but have never stumbled across them ourselves. Anyone know the answer?

WHAT IS IT?

This being football season I have been noticing many football games being fed on WESTAR in particular which don't seem to measure up to the quality levels I normally expect from these birds. I often see what appear to be remote live broadcasts originating at some stadium someplace which are far weaker through the bird than regular transmissions. I saw one recently that started off with color bars that said 'Wold / Mobile' during the set up period. This was on transponder 1 of WESTAR 1. Just minutes before there was a high quality picture on the same transponder for ABC but the 'Wold' signal was filled with sparklies. Can you explain this?

Neil Segmant
New York, N.Y. 10003

Robert Wold is an aggressive chap in Los Angeles who started years ago leasing large blocks of transponder time from WESTAR and SATCOM. He guarantees to take (and pay them for) say 15,000 hours per year. Then he goes out and rents that time to others. He buys big hunks for the lowest possible time-rate-charges and then sells smaller chunks for larger fees. He packages his re-sale of satellite time with mobile (i.e. capable of being moved) uplink terminals and he goes to a stadium under contract and sells both his mobile uplink service and his satellite time as a package. 'Wold/Mobile' is his portable or mobile 4.5 meter uplink system. It is trailer mounted (a small for uplink purposes 4.5 meter antenna) and rolls to a site and turns on. The weaker signal through the bird is due largely to the use of the lower gain (i.e. smaller size) uplink antenna. He is feeding from the stadium via the satellite back to some master uplink/downlink site such as Vernon Valley. With their 50-60 foot antennas on the receive end they don't see the sparklies you see since they make up at their end for his weak uplink signal. It is possible to get uplink video through the bird with less than massive uplink antennas provided you either are willing to settle for weaker downlink signals (i.e. some noise) or have the ability at the downlink to use a big enough antenna to make up for the lower uplink signal level to the bird. It is just your home terminal in reverse; small going up, big coming down rather than big going up and small coming down.

PARADE

Can you possibly send me the directions for building the parabolic antenna which I read about in PARADE (Sunday newspaper supplement)? I live in the 'outback' of Alabama and receive only three cruddy stations from Birmingham. I would certainly like to receive other stations; Atlanta's WTBS in particular.

Earle Hill
Harpersville, AL 35078

The late September PARADE piece which many of you saw resulted in nearly 10,000 pieces of mail and telephone calls at STT. Out of this exposure we expect to see several hundred brand new earth stations up and running before long.

LOOKING FOR TAPE

During the SPTS '80 San Jose Coop allowed the Board of Directors for SPACE to make a presentation to all of the

registrants, asking for financial support for SPACE. The unscheduled meeting was held around 4 PM Saturday afternoon July 5th outside on the grounds of the Hyatt Lodge. I would like to locate a video tape of that initial SPACE meeting. I will be glad to pay for the tape, cost of the duplication and transportation. The tape can be either BETA II or VHS although I would prefer BETA II. Anyone knowing the whereabouts of such a tape is asked to contact me.

L. Russell Keene II
Satellite Safety Systems, Inc.
1625 Arizona Street
Sulphur, LA 70663
(318/527-8609)

We had asked Dana Atchley to tape the start of this impromptu meeting but as luck would have it the audio portion got botched. We saw at least one chap with a camera running during part of this session; anyone have a tape? We'd like to get a copy as well here at STT.

CBN PERMISSION

I have seven new satellite viewing customers who we would like to receive your "Coop's / CBN Permission" certificate. I have just completed mine from the September issue of CSD but I cannot help protect my customers without your help. I would be happy to pay for additional certificates if you could provide them.

Ben D. Shaw, President
Mountain Satellite TV, Inc.
Durango, CO 81301

I have followed your instructions in connection with CBN and would be pleased to know if we can get the same permission from PTL, Trinity, The National Christian Network, C-Span, and so on. Let me commend you for your attention to HR 7747 and the good advice to your subscribers in connection with permission to view satellites.

Howard R. Sluyter
Dallas, Texas 75202

Thanks for the informative article in the September CSD entitled "Getting CSD Readers Off The 'Permission Hook'". I have sent in my registration for certification for CBN and would very much like to have the same permission from PTL, Trinity and the National Christian Network as mentioned in your article. Please advise how we contact these people.

Jimmy Johnson
Muscle Shoals Sound Studio
Sheffield, AL 35660

Apparently most readers took the time to get themselves 'registered' with CBN. The certificate appearing in CSD for September was designed to make it easier on CBN in the processing of your applications. Anyone can do the same thing by writing a letter to any of the services to follow. Tell them you are a private terminal viewer, where you live, and that you wish to have their official written permission to view their satellite services. You should receive a letter back from them and they may (or may not) also place you on a mailing list to receive their program guide and other goodies. (1) **National Christian Network** (on COMSTAR D2 on transponder 7 (vertical). Ray Kassis, NCN, 1150 West King Street, Cocoa, Florida 32992. (2) **Trinity Broadcasting** (KTBN on transponders 13 D2 and 13 F1; sometimes). Bill Miller, TBN, P. O. Box A, Santa Ana, CA 92711. (3) **People That Love** (PTL; on transponder 2, F1). Dave Morrow, PTL, 7224 Park Rd., Charlotte, NC 28279. (4) **Christian Broadcasting Network** (CBN; transponder 8 on F1). Scott Hesseck, CBN, Virginia Beach, VA 23463. (5) **Cable - Satellite Public Affairs Network** (C-SPAN on transponder 9, F1). Jana Dobrowski, C-SPAN, 3800 N. Fairfax, Arlington, VA 22203. (6) **Modern Satellite Network** (MSN on transponder 22, F1, daytimes). Jay Campbell, 45 Rockefeller Plaza, New York, New York 10111.

BIRD OPERATIONAL NOTES

SATRX has opened new offices for their private terminal receiver operation in Southern California. You can contact Barney Phillips at (SATRX) 20790 Leapwood Avenue, Carson, California 90746 (213/515-5302).

NEWEST programming slant to join bird is **Video Concert Hall**. VCH previously appeared as part of SPN program package, now using transponder 16 (sub-let from SHOWTIME) with 90 minute per evening block Monday-Saturday.

BBC, unhappy with Time-Life dropping of BBC service on satellite after loss of FIII now moving directly into U.S. market; has opened offices in New York City and will explore on own ways to delivery BBC programs to U.S. viewers (via satellite).

NEW companion for Luly's 'Umbrella TVRO Antenna' may be coming soon; **SEIKO** is demonstrating LCD picture screen barely 1 x 1.5 inches across and 'wristwatch TV receiver' is expected in relatively short time.

PLAYBOY Clubs seriously studying installation of 'international' network of receive (plus some transmit) TV terminals. Ten U.S. locations plus four off shore are part of study that calls for transmission of live entertainment to guests on 'closed circuit' basis, plus tele-conferencing between groups staying at various locations. **PLAYBOY** sent representative to study small earth terminals at **first SPTS in 1979** and they have stayed on top of satellite explosion since that time.

EXPANSION of TeleFrance to three hours per night (10PM to 1AM EST) on SPN (transponder 21 on F1, transponder 17/9 on WESTAR III) is attracting interest in isolated areas of French influence. Broadcasting officials in Haiti the latest to study daily service with an eye towards using some of it for Television Nacional service in country.

WESTAR II, not in use these days by many regular (i.e. scheduled, daily) programmers picked up Independent News Network (INN) weekday feed at 9PM and weekend feed at 9:30 PM (EST) on transponder 2.

COMSTAR D2 slowly coming to life as 'second cable bird'. NCN religious programming on TR7 (vertical) plus evening feeds of BRAVO and ESCAPADE on same transponder plus TBN on TR 13 and HBO (east) on TR 18 (horizontal) are primary signals present. Future of WESTAR III as 'viable' alternate cable bird now seems in some doubt simply because the limited capacity on the 12 channel bird precludes expansive cable use at this time.

FCC approval of DBS concept seems to have dropped out of view as quickly as it rose; FCC decision merely was statement of intent to proceed with some form of service in the 11/12 GHz band 'subject to the Regional (Western Hemisphere) Conference to be held in 1983'. Opponents of plan now feel there is plenty of time to stop it but recently approved concept of low powered TV broadcast stations seems like more immediate danger to the established broadcasting groups.

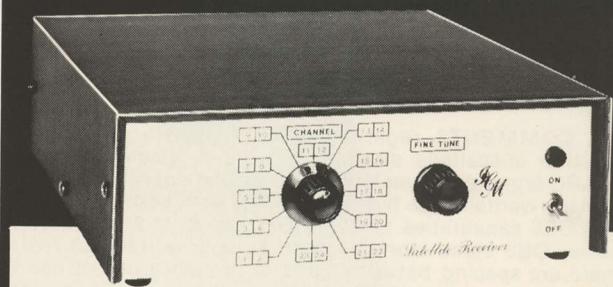
WESTERN UNION is already taking 'orders' for transponders on WESTAR V (a 24 channel bird scheduled to

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Model TV-4300A . . . supplied with remote control and six frequency, crystal control, audio with stereo output	\$1,149.00

Write for information



INTERNATIONAL CRYSTAL MANUFACTURING CO., INC.
10 N. Lee, Oklahoma City, Oklahoma 73102, 405-236-3741

replace WESTAR II), due to launch late in 1982. Price for 24 hour per day protected service is \$2,000,000 per year.

LIVE TV coverage of Voyager I encounter - flyby of Saturn was carried on F1 TR 10 and 16 in mid-November. Earlier encounter with Jupiter was also carried on same transponders. Service was put together at California Jet Propulsion Lab (JPL).

CBN has changed name but not initials; now Continental Broadcasting Network from Christian Broadcasting Network. CBN is attempting to broaden appeal with new programming including football, and specials on Mondays.

HAWKS basketball on Super 17 includes 60 games this season. Schedule began October 11th, runs through March 27th. Games early in December include Celtics on 3rd (7:30 PM eastern), 76'ers on 5th (8 PM). Clippers on 9th (8 PM), Pistons on 10th (8 PM), Nets on 16th (7:30 PM).

SCRAMBLED delivery of October Ali-Homes fight on WESTAR was handled by Oak Industries 'satellite encoding and decoding system'. Ostensibly the WESTAR service was intended for delivery to Alaskan viewers on theater circuit. Program carrier, Wold Entertainment, liked the system performance and plans to use it in future 'when the security of the programming must be protected'.

COMMENTS regarding 1983 regional conference on satellite allocations starting to surface. Canada and U.S. WARC arguments over how to use geostationary belt renewed; Canada wants to use hybrid satellites with both narrow band and DBS capabilities in 11/12 GHz band. U.S. prefers high power DBS stand alone birds. U.S. approach would require more arc spacing between birds to prevent interference but offers larger coverage areas and smaller antennas as trade. COMSAT's long awaited plans boils down to 8 satellites at 115 degrees west, plus 135, 155 and 175 with more westerly birds intended for mountain and Pacific time zones. Birds would be 200 watt transmitter power and provision is planned to cover Alaska, Hawaii and Puerto Rico. CBS meanwhile suggests that

all 11/12 GHz DBS service be dedicated to 'high resolution' video (i.e. more than present 525 line system). Broadcasters suggest rather than high power, DBS system should be a 'community reception' service (feeding cable or local broadcast transmitters).

CONTROVERSIAL PREMIERE movie service (see **CSD** for June 1980, page P9) has elected to utilize F1 transponder 21 (to be leased from SPN) for **west** coast (Pacific, Mountain) and COMSTAR transponder 9 (V) for feeds of movie service. Legal challenges persist, odds are service will not survive.

SHOWTIME will be owned 50% by Westinghouse after electronics giant elected to purchase 100% of massive TelePrompTer cable TV MSO. TPT had bought 50% interest in SHOWTIME several years ago.

GENUINE

HOWARD TERMINAL PC CARDS

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These field proven and tested high quality boards are available as a five-board-package for \$99 package price (you receive A, B, C, E and F above). Included is complete documentation for construction and a list of parts stocking distributors.

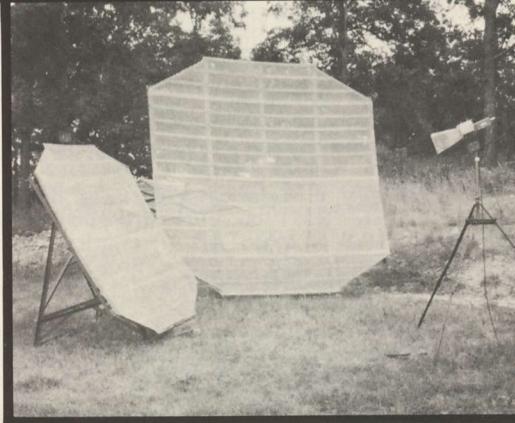
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The KLM SKY EYE I RECEIVER package delivers these outstanding features:

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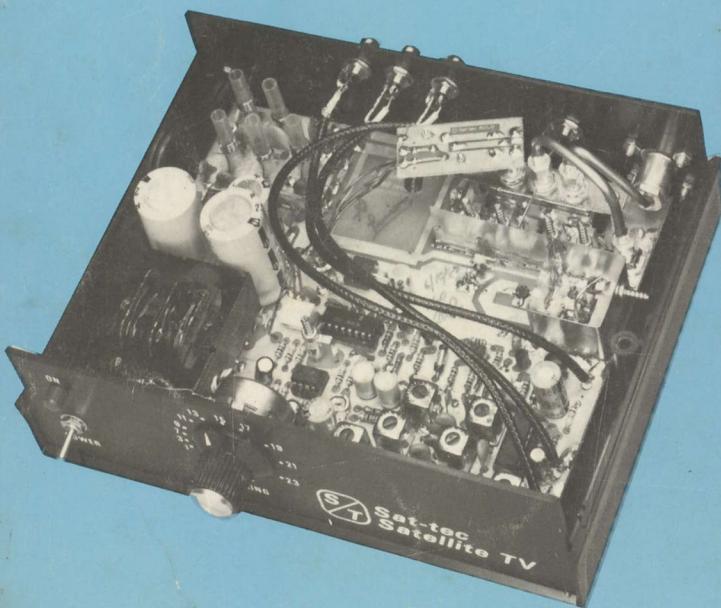
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